Using AVGWLF at the State and Regional Level to Develop Watershed Pollutant Loads and Link BMPs and Water Quality

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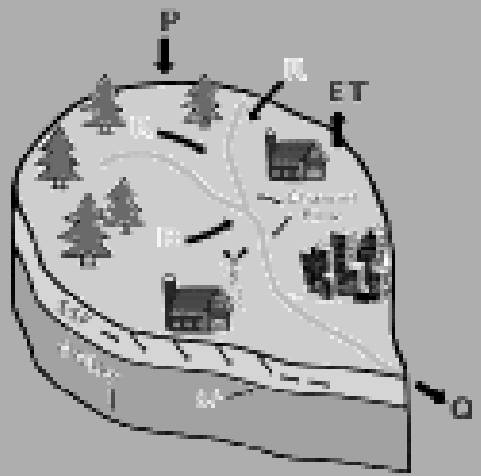
Pennsylvania State University

Principal Tools/Methods

- *Use GIS-based watershed simulation model (AVGWLF) to estimate nutrient and sediment loads*
- *Estimate possible pollution reductions based on use of selected BMPs and other pollution mitigation strategies*
- *Document ongoing pollution-reduction activities in GIS-based application to support above analyses*

AVGWLF

ArcView GWLF Interface for Windows
Version 3.2



Created by

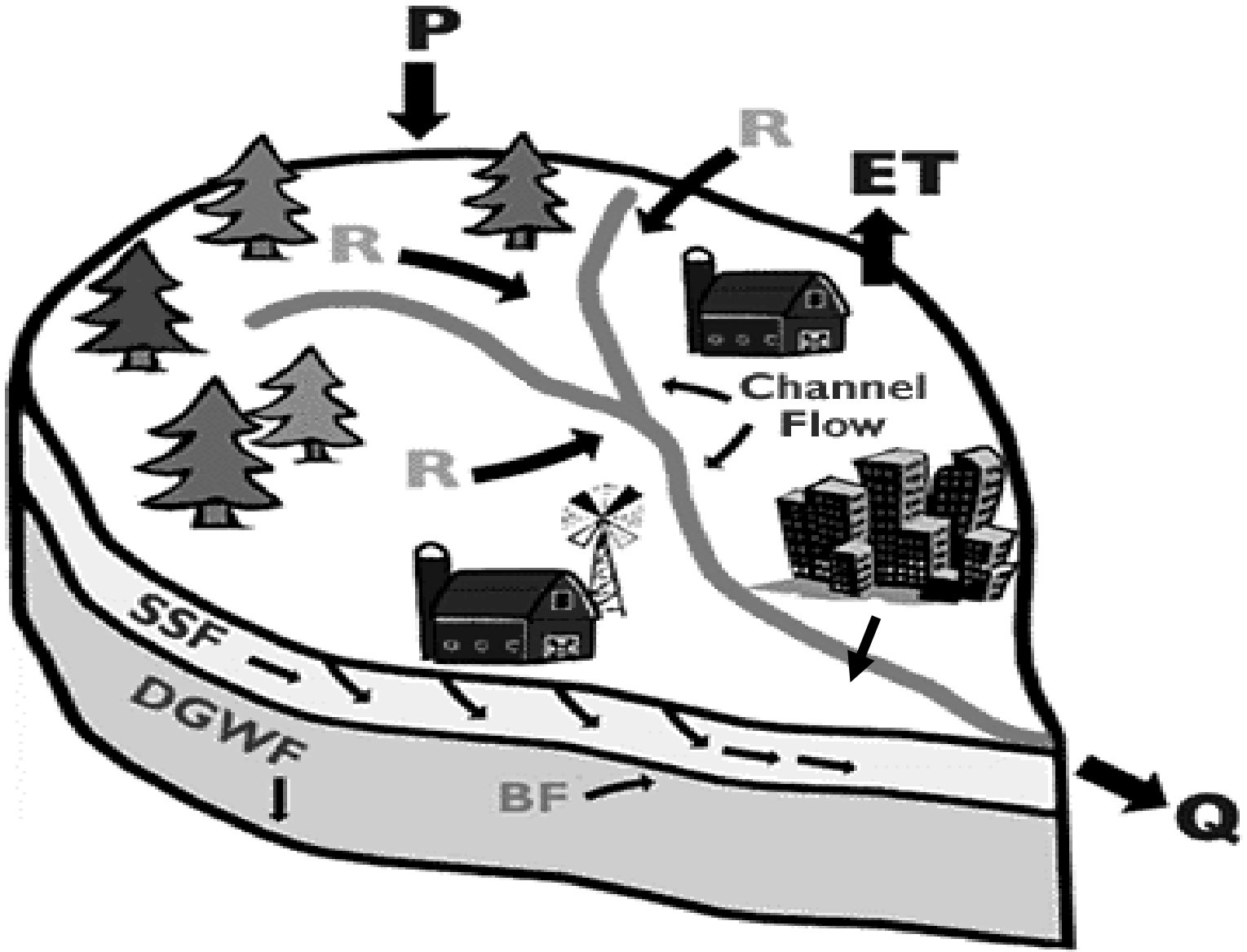
David W. Lehning

Barry M. Evans

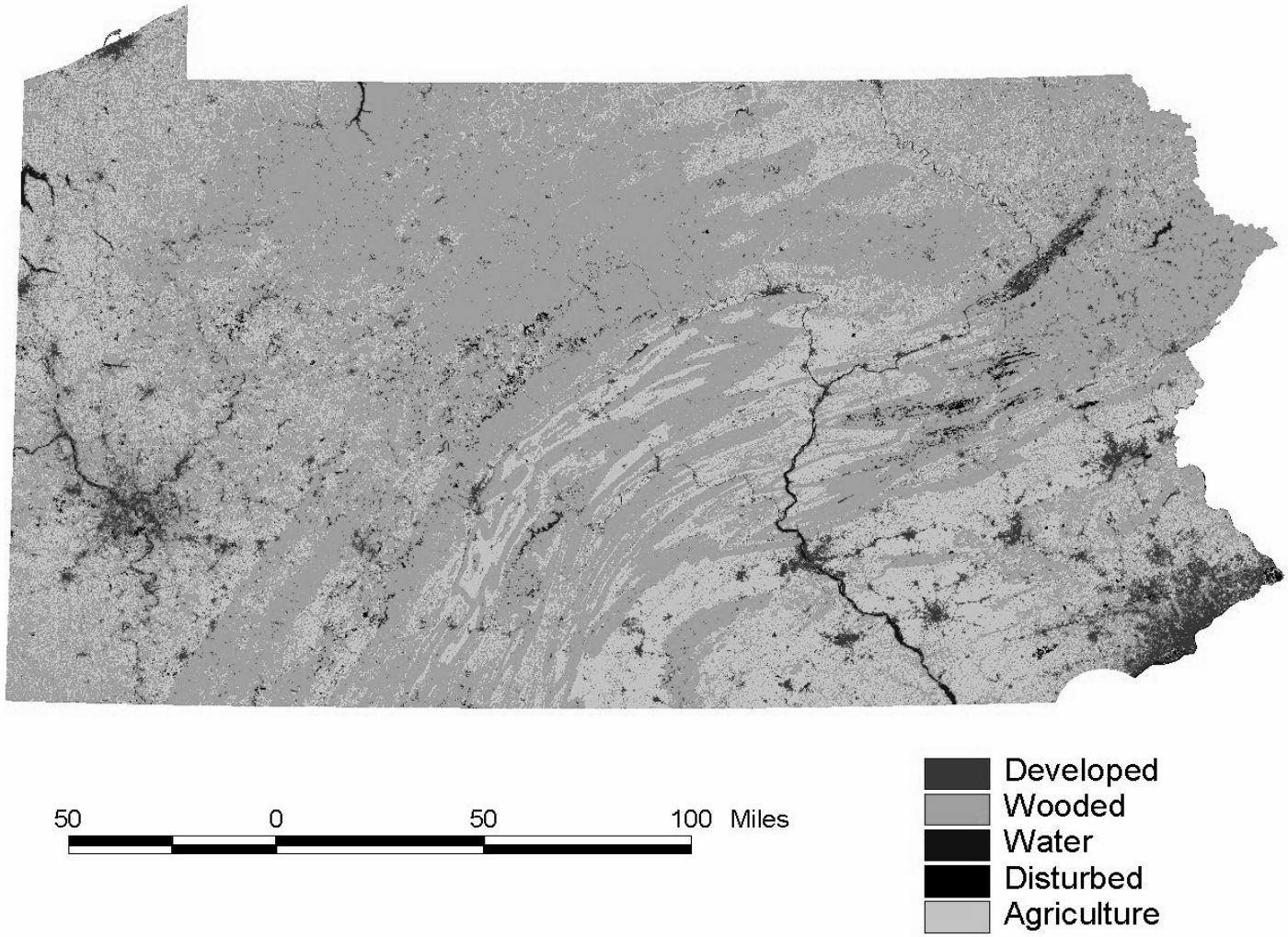
PENNSTATE

http://www.avgwlf.psu.edu/

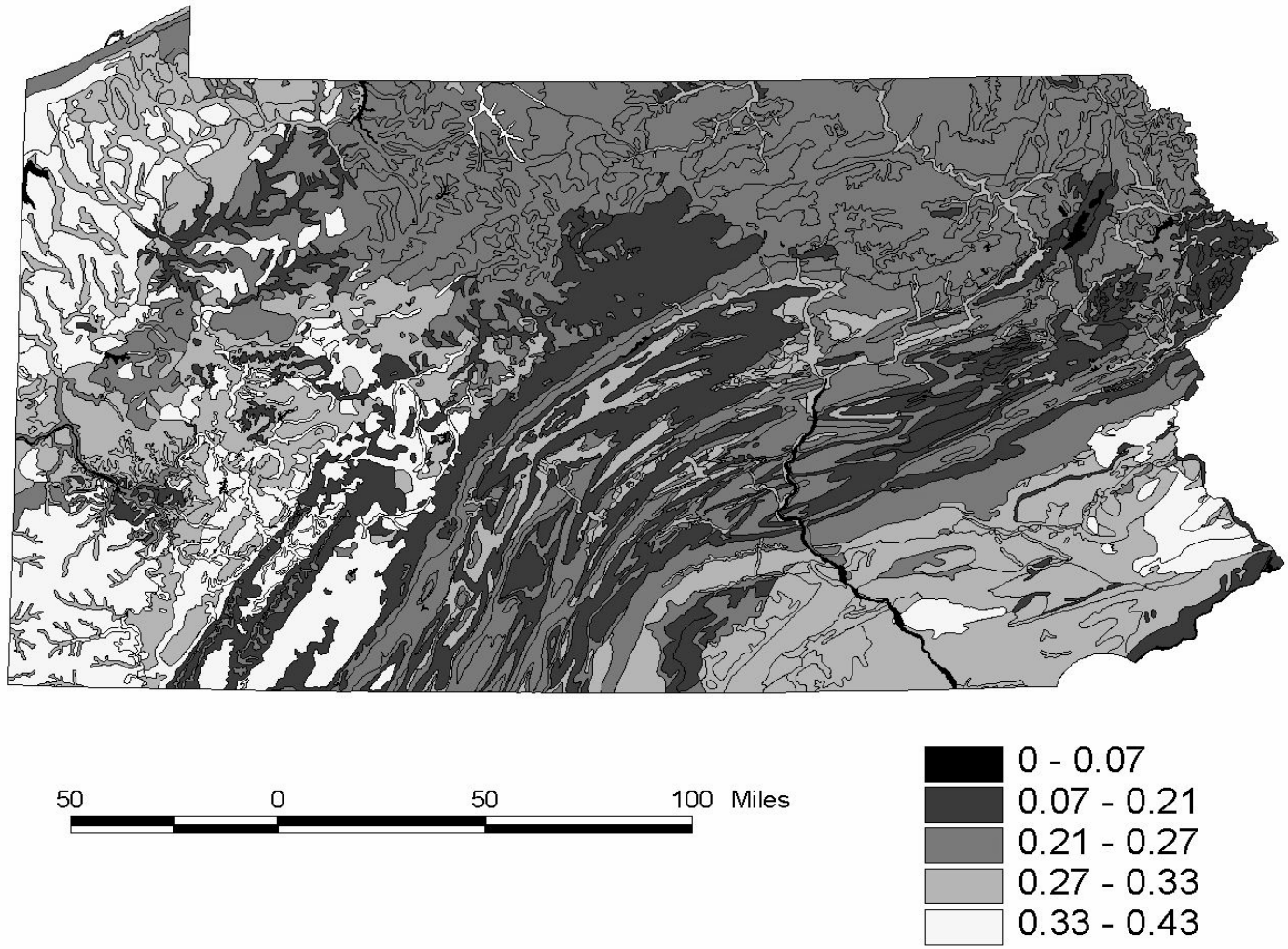
Watershed-Level Processes and Fluxes



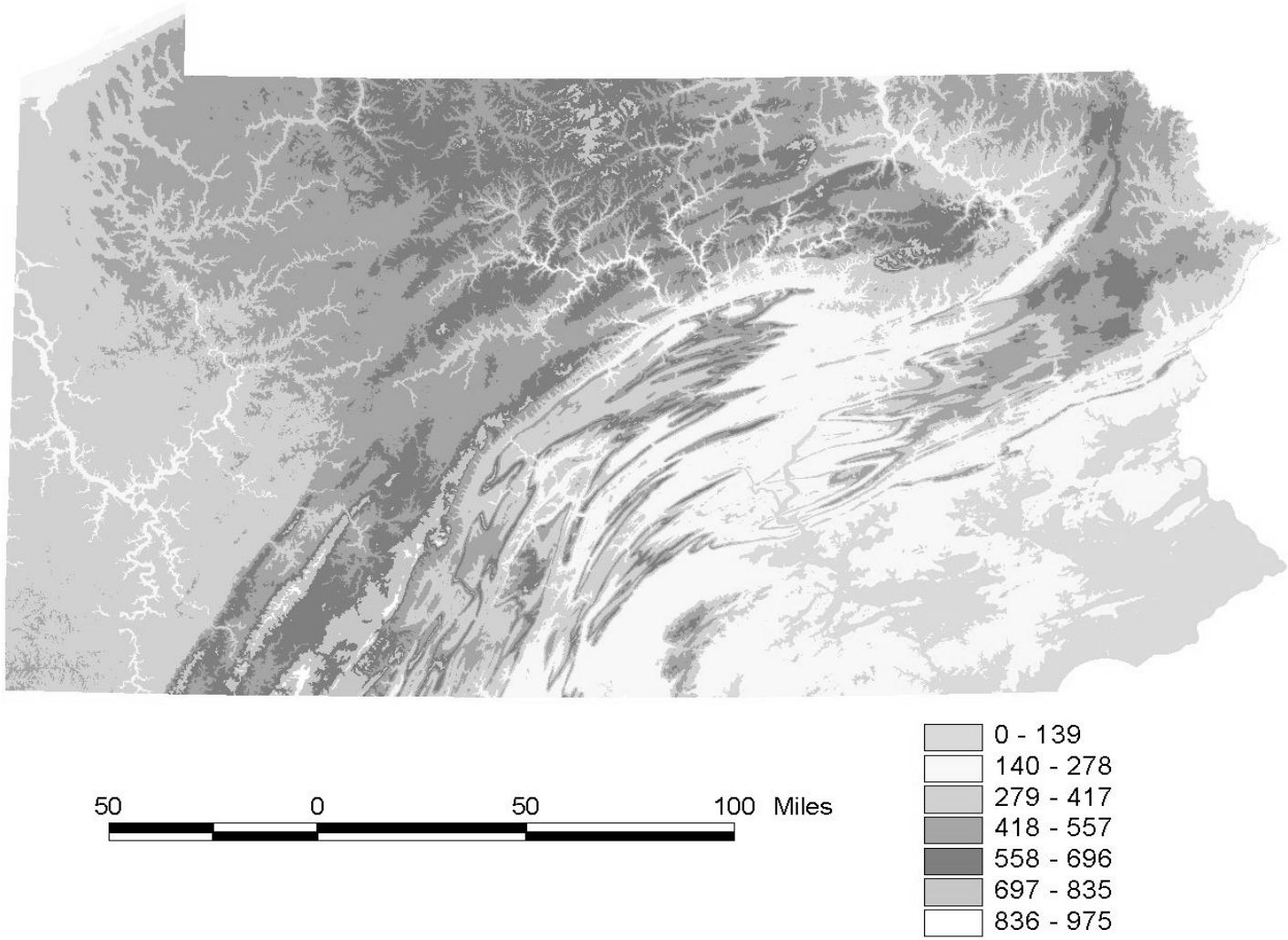
Generalized Land Use/Cover Map of Pennsylvania

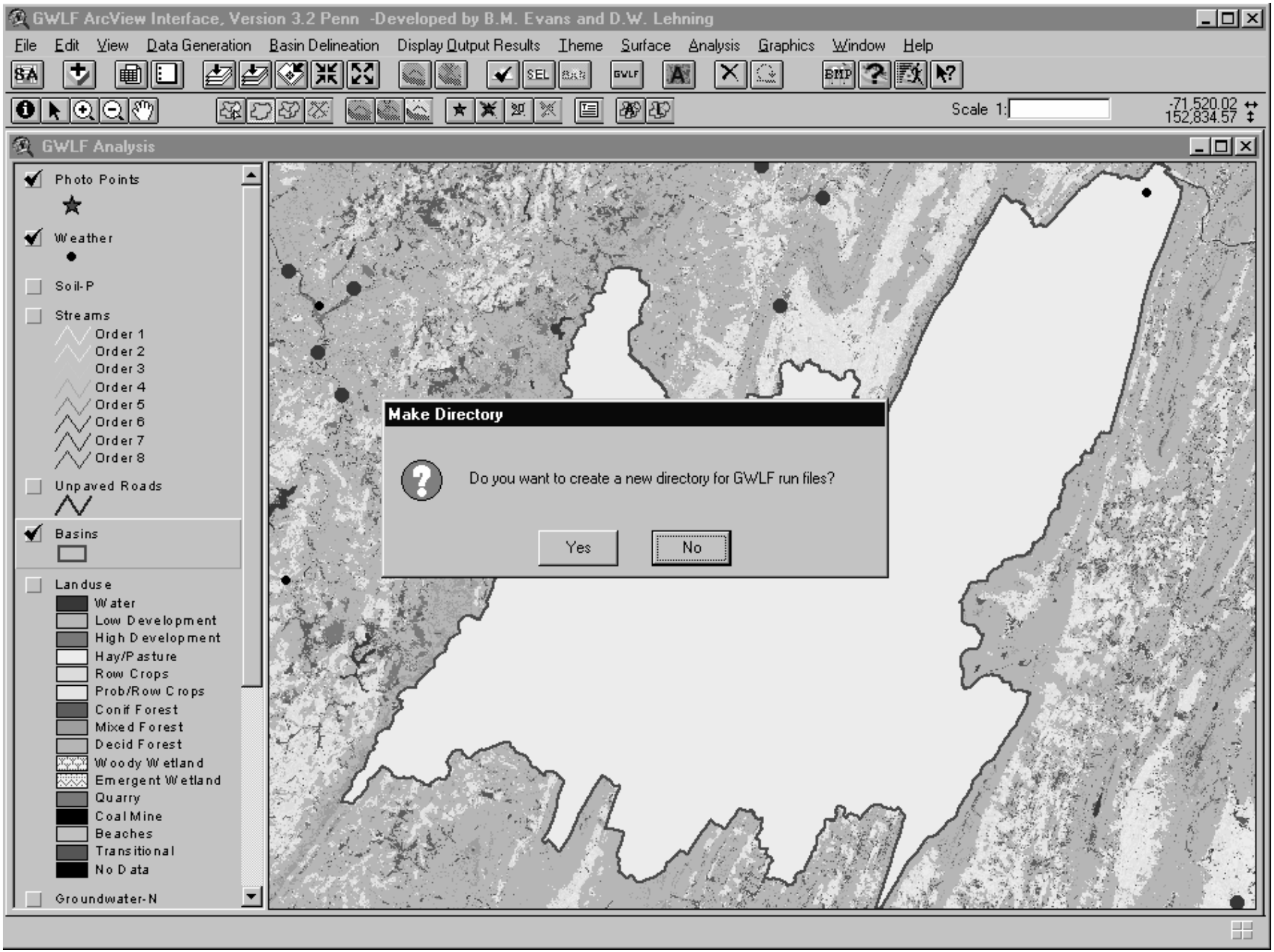


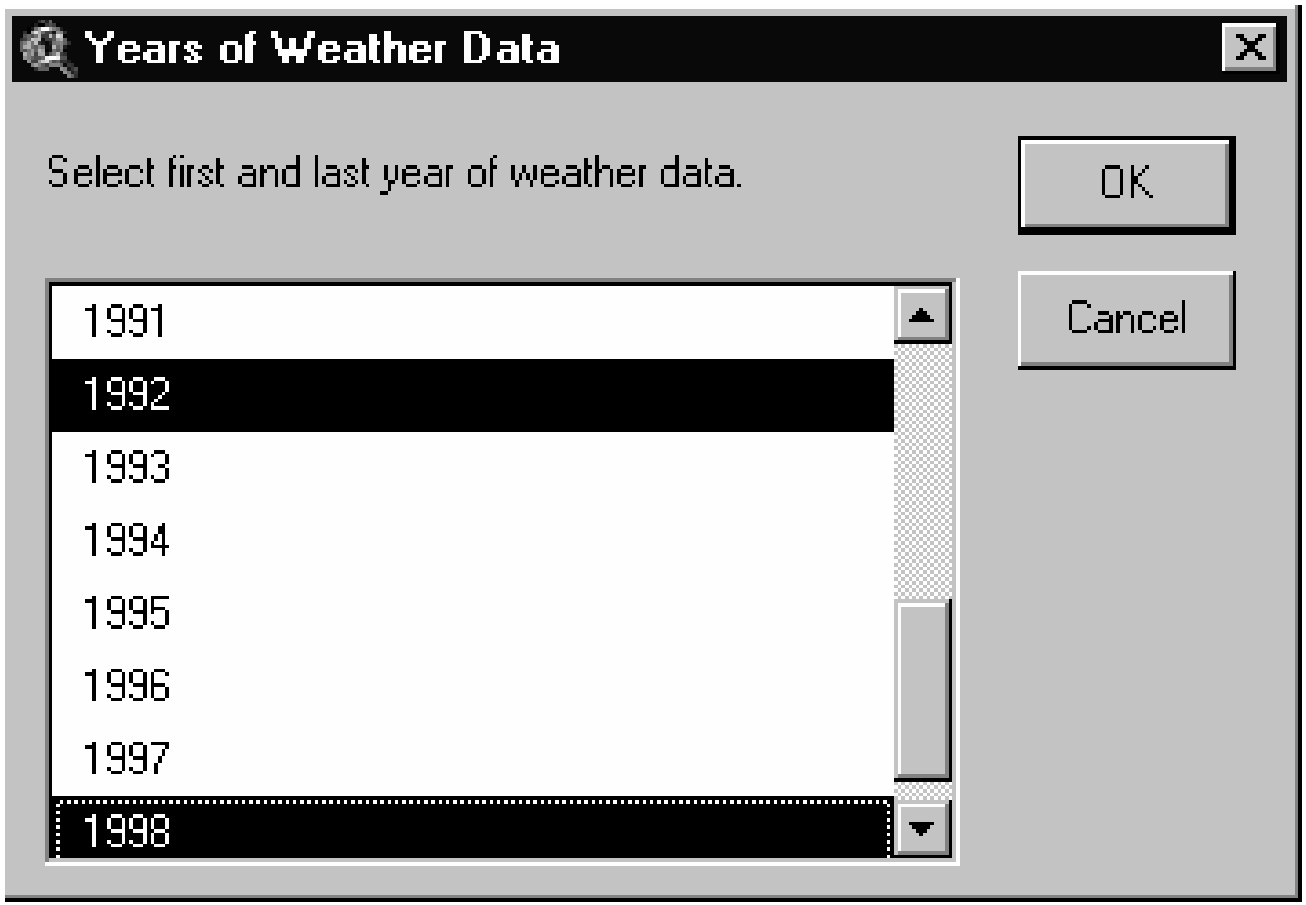
Inherent Soil Erodibility (K-Factor)

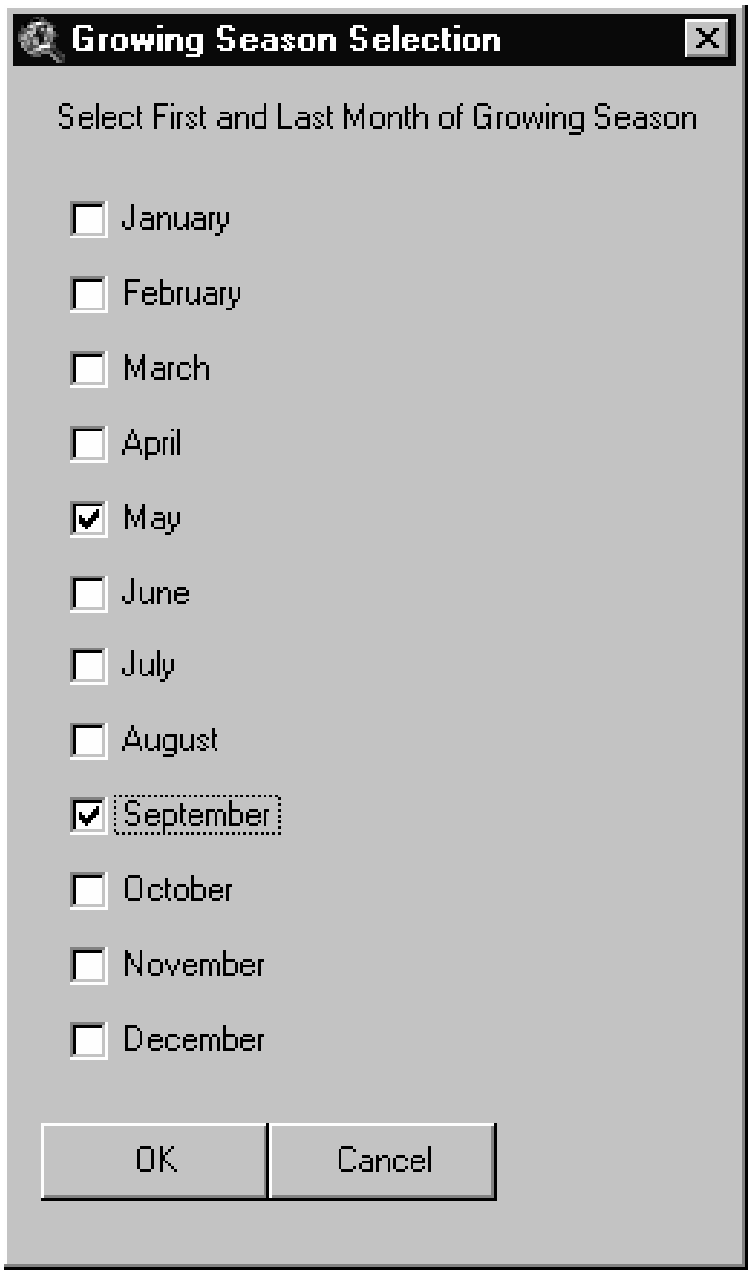


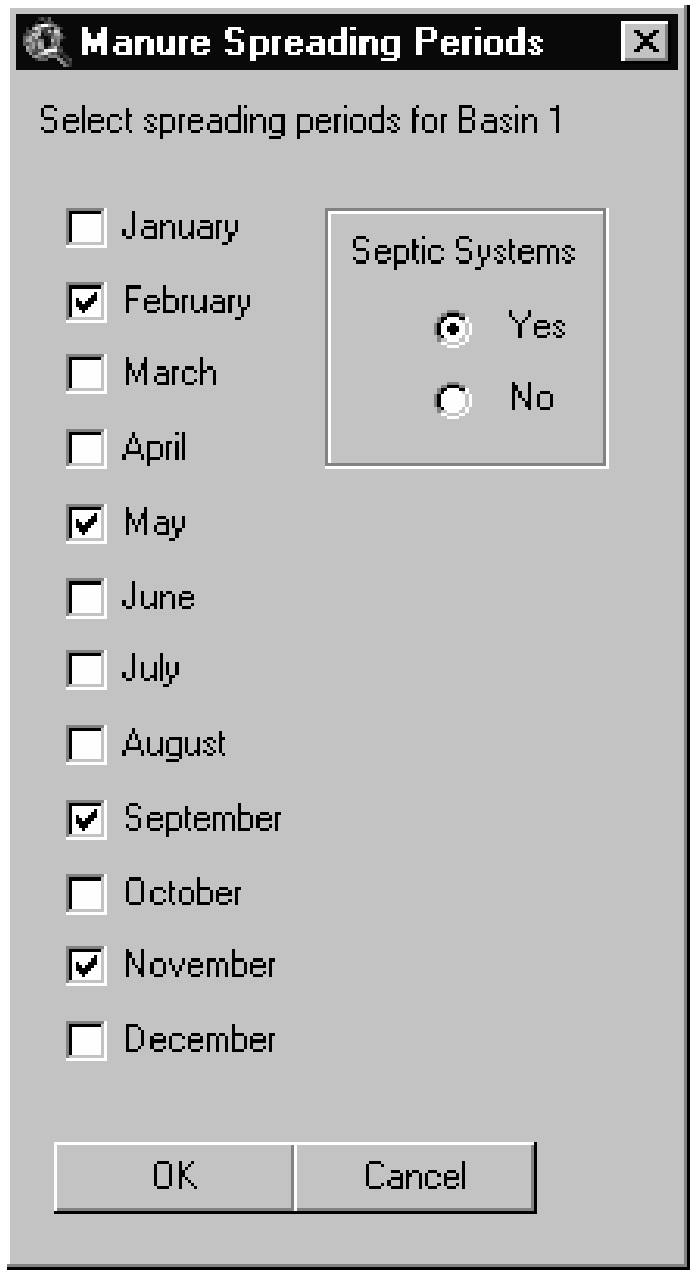
Topography (Elevation in Meters)

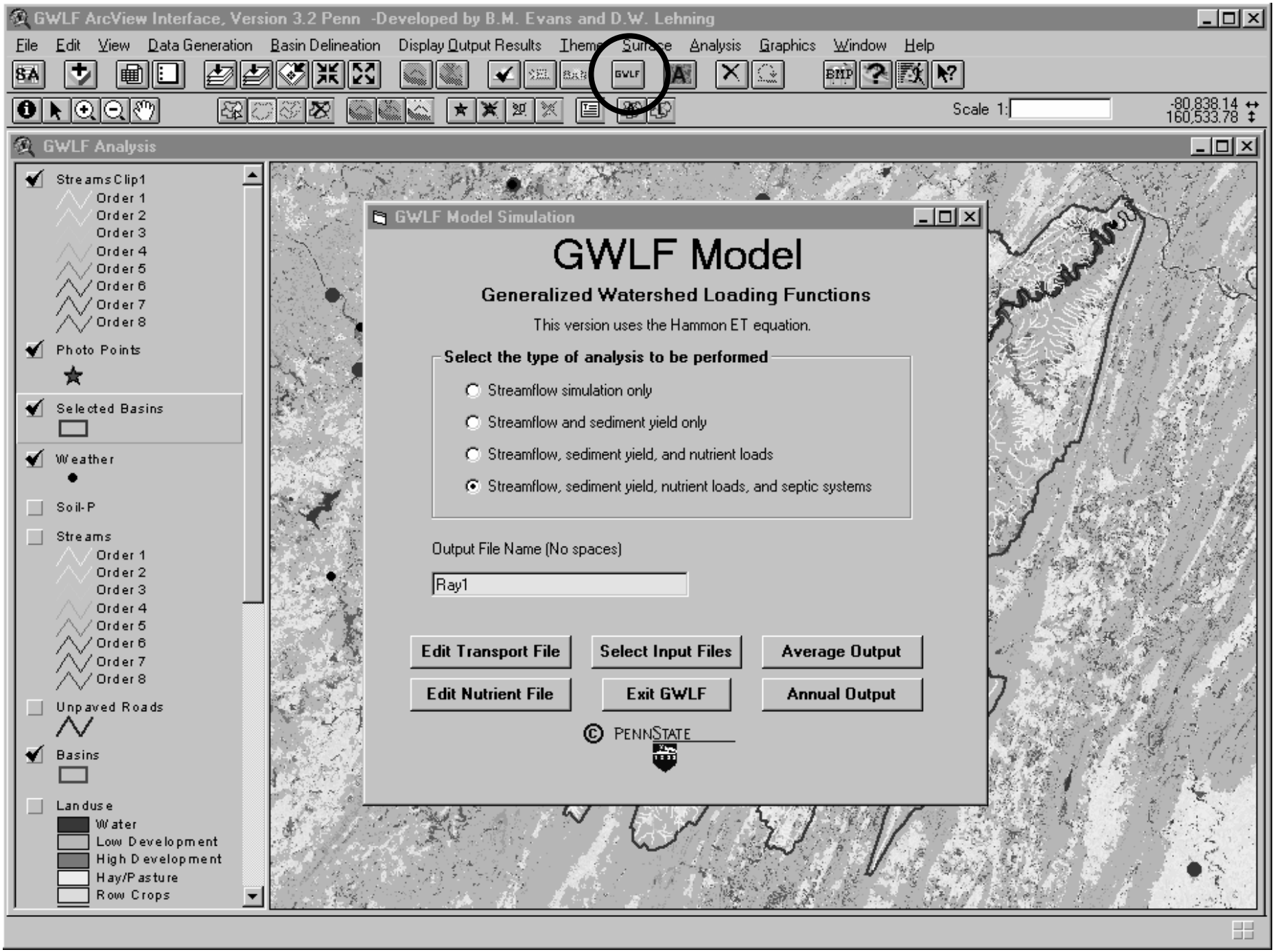


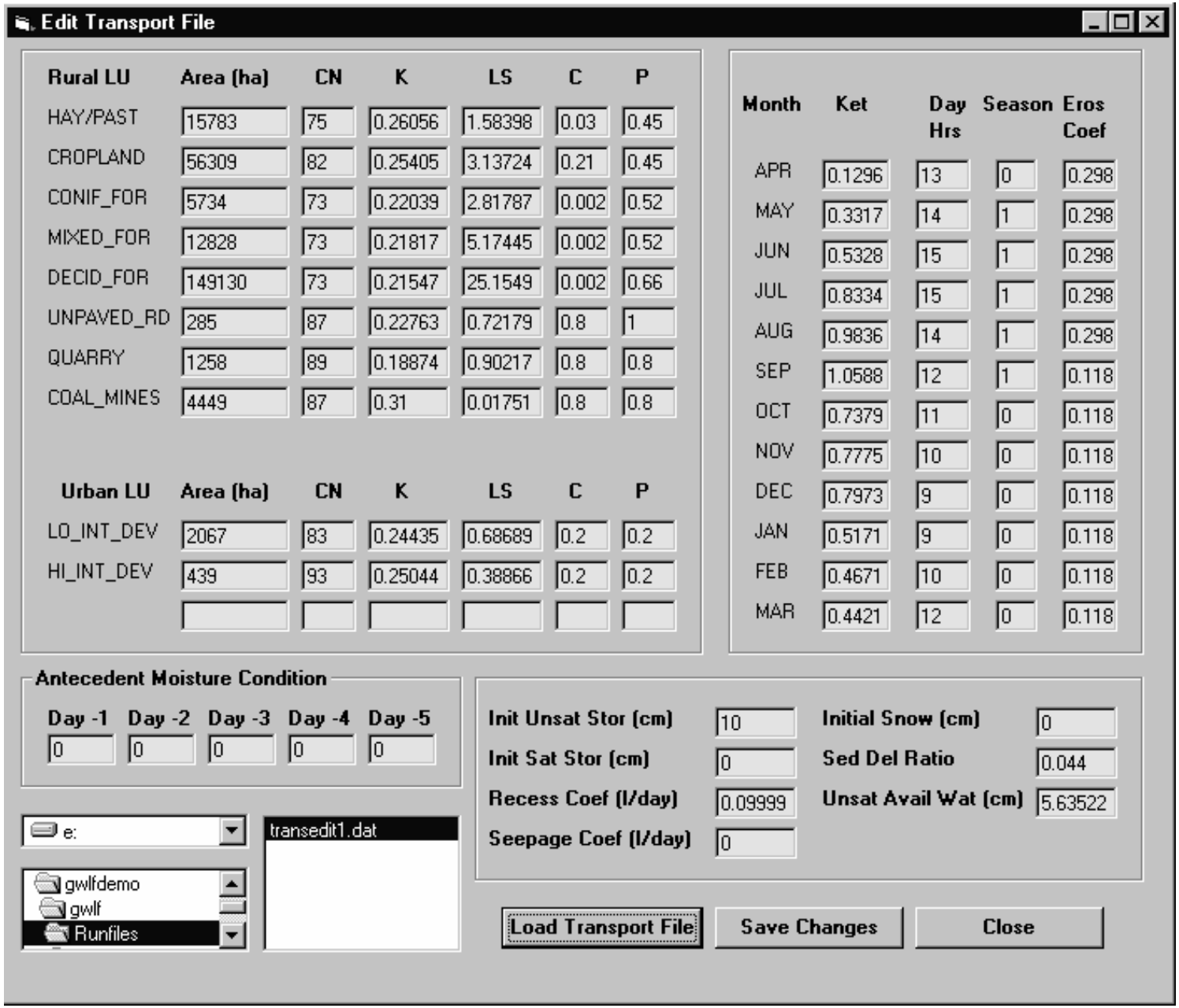

GWLF ArcView Interface, Version 3.2 Penn -Developed by B.M. Evans and D.W. Lehning
File Edit View Data Generation Basin Delineation Display Output Results Theme Surface Analysis Graphics Window Help
Scale 1:
-71,520.02
152,834.57
GWLF Analysis
Photo Points
Weather
Soil-P
Streams
Order 1
Order 2
Order 3
Order 4
Order 5
Order 6
Order 7
Order 8
Unpaved Roads
Basins
Landuse
Water
Low Development
High Development
Hay/Pasture
Row Crops
Prob/Row Crops
Conif Forest
Mixed Forest
Decid Forest
Woody Wetland
Emergent Wetland
Quarry
Coal Mine
Beaches
Transitional
No Data
Groundwater-N
Make Directory
Do you want to create a new directory for GWLF run files?
Yes
No

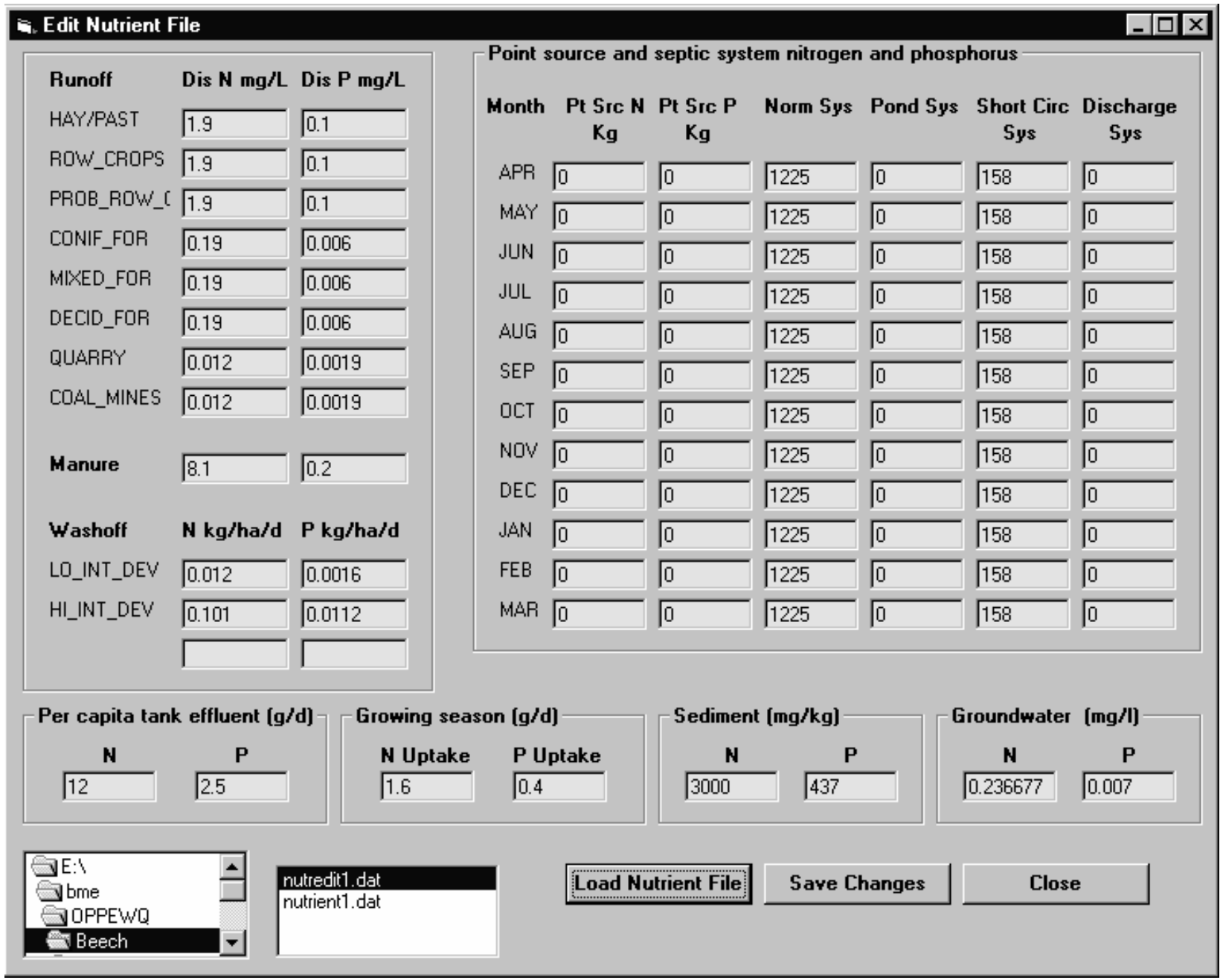

Years of Weather Data
Select first and last year of weather data.
OK
Cancel
1991
1992
1993
1994
1995
1996
1997
1998


Growing Season Selection
Select First and Last Month of Growing Season
January
February
March
April
May
June
July
August
September
October
November
December
OK
Cancel


Manure Spreading Periods
Select spreading periods for Basin 1
January
February
March
April
May
June
July
August
September
October
November
December
Septic Systems
Yes
No
OK
Cancel


GWLF ArcView Interface, Version 3.2 Penn -Developed by B.M. Evans and D.W. Lehning
File Edit View Data Generation Basin Delineation Display Output Results Theme Surface Analysis Graphics Window Help
GWLF
Scale 1:
-80,838.14
160,533.78
GWLF Analysis
Streams Clip1
Order 1
Order 2
Order 3
Order 4
Order 5
Order 6
Order 7
Order 8
Photo Points
Selected Basins
Weather
Soil-P
Streams
Order 1
Order 2
Order 3
Order 4
Order 5
Order 6
Order 7
Order 8
Unpaved Roads
Basins
Landuse
Water
Low Development
High Development
Hay/Pasture
Row Crops
GWLF Model Simulation
GWLF Model
Generalized Watershed Loading Functions
This version uses the Hammon ET equation.
Select the type of analysis to be performed
Streamflow simulation only
Streamflow and sediment yield only
Streamflow, sediment yield, and nutrient loads
Streamflow, sediment yield, nutrient loads, and septic systems
Output File Name (No spaces)
Ray1
Edit Transport File
Select Input Files
Average Output
Edit Nutrient File
Exit GWLF
Annual Output
© PENNSTATE


Edit Transport File
Rural LU
Area (ha)
CN
K
LS
C
P
HAY/PAST
15783
75
0.26056
1.58398
0.03
0.45
CROPLAND
56309
82
0.25405
3.13724
0.21
0.45
CONIF_FOR
5734
73
0.22039
2.81787
0.002
0.52
MIXED_FOR
12828
73
0.21817
5.17445
0.002
0.52
DECID_FOR
149130
73
0.21547
25.1549
0.002
0.66
UNPAVED_RD
285
87
0.22763
0.72179
0.8
1
QUARRY
1258
89
0.18874
0.90217
0.8
0.8
COAL_MINES
4449
87
0.31
0.01751
0.8
0.8
Urban LU
Area (ha)
CN
K
LS
C
P
LO_INT_DEV
2067
83
0.24435
0.68689
0.2
0.2
HI_INT_DEV
439
93
0.25044
0.38866
0.2
0.2
Month
Ket
Day Hrs
Season
Eros Coef
APR
0.1296
13
0
0.298
MAY
0.3317
14
1
0.298
JUN
0.5328
15
1
0.298
JUL
0.8334
15
1
0.298
AUG
0.9836
14
1
0.298
SEP
1.0588
12
1
0.118
OCT
0.7379
11
0
0.118
NOV
0.7775
10
0
0.118
DEC
0.7973
9
0
0.118
JAN
0.5171
9
0
0.118
FEB
0.4671
10
0
0.118
MAR
0.4421
12
0
0.118
Antecedent Moisture Condition
Day -1
Day -2
Day -3
Day -4
Day -5
0
0
0
0
0
Init Unsat Stor (cm)
10
Initial Snow (cm)
0
Init Sat Stor (cm)
0
Sed Del Ratio
0.044
Recess Coef (l/day)
0.09999
Unsat Avail Wat (cm)
5.63522
Seepage Coef (l/day)
0
e:
transedit1.dat
gwlfdemo
gwlf
Runfiles
Load Transport File
Save Changes
Close


Edit Nutrient File
Runoff
Dis N mg/L
Dis P mg/L
HAY/PAST
1.9
0.1
ROW_CROPS
1.9
0.1
PROB_ROW_(
1.9
0.1
CONIF_FOR
0.19
0.006
MIXED_FOR
0.19
0.006
DECID_FOR
0.19
0.006
QUARRY
0.012
0.0019
COAL_MINES
0.012
0.0019
Manure
8.1
0.2
Washoff
N kg/ha/d
P kg/ha/d
LO_INT_DEV
0.012
0.0016
HI_INT_DEV
0.101
0.0112
Point source and septic system nitrogen and phosphorus
Month
Pt Src N Kg
Pt Src P Kg
Norm Sys
Pond Sys
Short Circ Sys
Discharge Sys
APR 0 0 1225 0 158 0
MAY 0 0 1225 0 158 0
JUN 0 0 1225 0 158 0
JUL 0 0 1225 0 158 0
AUG 0 0 1225 0 158 0
SEP 0 0 1225 0 158 0
OCT 0 0 1225 0 158 0
NOV 0 0 1225 0 158 0
DEC 0 0 1225 0 158 0
JAN 0 0 1225 0 158 0
FEB 0 0 1225 0 158 0
MAR 0 0 1225 0 158 0
Per capita tank effluent (g/d)
N
P
12
2.5
Growing season (g/d)
N Uptake
P Uptake
1.6
0.4
Sediment (mg/kg)
N
P
3000
437
Groundwater (mg/l)
N
P
0.236677
0.007
E:\
bme
OPPEWQ
Beech
nutredit1.dat
nutrient1.dat
Load Nutrient File
Save Changes
Close

Average Hydrology by Month

GWLF Transport Summary for Ray1

Period of analysis: 23 years, 1976 to 1998

	Units in Centemeters				
Month	**Precip**	**Evapotrans**	**Gr. Wat. Flow**	**Runoff**	**Streamflow**
APR	7.66	0.59	7.3	0.5	7.8
MAY	10.36	2.56	7.2	0.2	7.5
JUN	9.27	6.01	5.6	0.3	5.8
JUL	8.99	9.74	2.2	0.3	2.5
AUG	8.2	8.06	0.5	0.2	0.6
SEP	8.7	5.46	0.7	0.5	1.2
OCT	8.73	2.75	2.6	1	3.5
NOV	9.06	1.5	4.8	0.9	5.8
DEC	6.77	0.59	5.9	0.5	6.3
JAN	6.58	0.2	4	1.1	5.1
FEB	5.44	0.33	4.4	1	5.3
MAR	8.21	0.99	6.8	1.1	7.9
Total	97.97	38.77	51.9	7.5	59.4

Go Back | Loads by Month | Close

Average Loads by Month

GWLF Nutrient Summary for Ray1

Period of analysis: 23 years, 1976 to 1998

	Kg		Nutrient Loads (Kg)			
Month	Erosion	Sediment	Dis. Nitr.	Tot. Nitr.	Dis. Phos.	Tot. Phos
APR	148933.8	6553.1	234033.4	237567.2	2225.3	2857.5
MAY	231509.6	10186.4	232754	234729.5	2211.2	2546
JUN	222953.1	9809.9	178750.6	180659.3	1847.3	2173.8
JUL	233392.5	10269.3	70045	79651.5	1117.1	2892.1
AUG	202436.9	8907.2	16402.4	26389.6	754.5	2603.8
SEP	100689.7	4430.3	62595.2	78276.7	1775.1	4696.4
OCT	105314.7	4633.8	159154.9	185376.7	3068.6	7961.9
NOV	100773.2	4434	224969	254778.7	3406.9	8965.4
DEC	36663.9	1613.2	189214.1	196717	1925.4	3294.9
JAN	12818.7	564	130788.2	162028.4	1531.6	7360.3
FEB	26275.3	1156.1	140764.1	165622.6	1596	6227
MAR	46575	2049.3	217613.8	255396.1	2116.4	9163.5
Total	1468336.4	64606.8	1857084.6	2057193.2	23575.5	60742.7

Go Back | Loads by Source | Close

Average Loads by Source

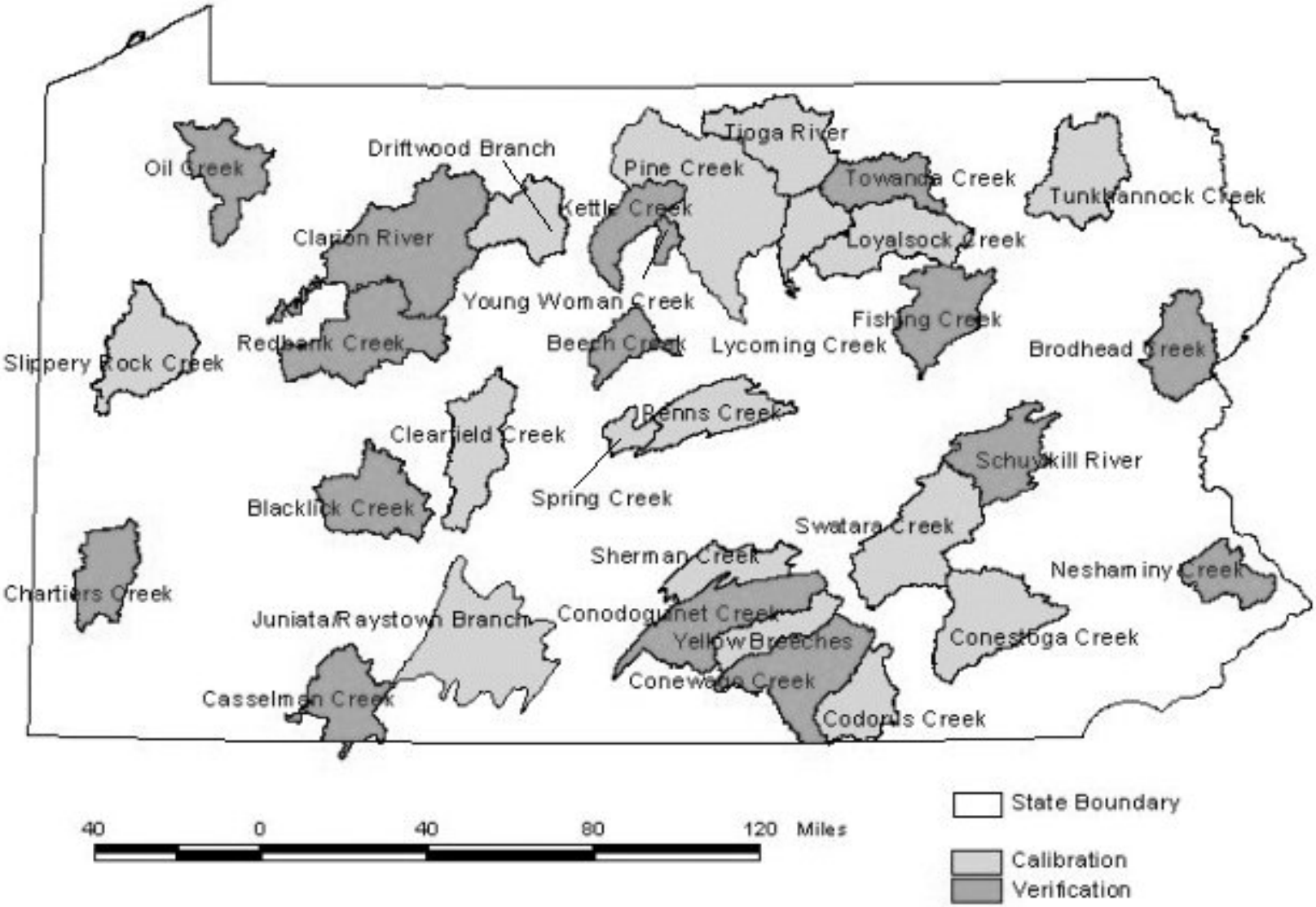
GWLF Total Loads for Run99

Period of analysis: 7 years, from Apr 1989 to Mar 1996

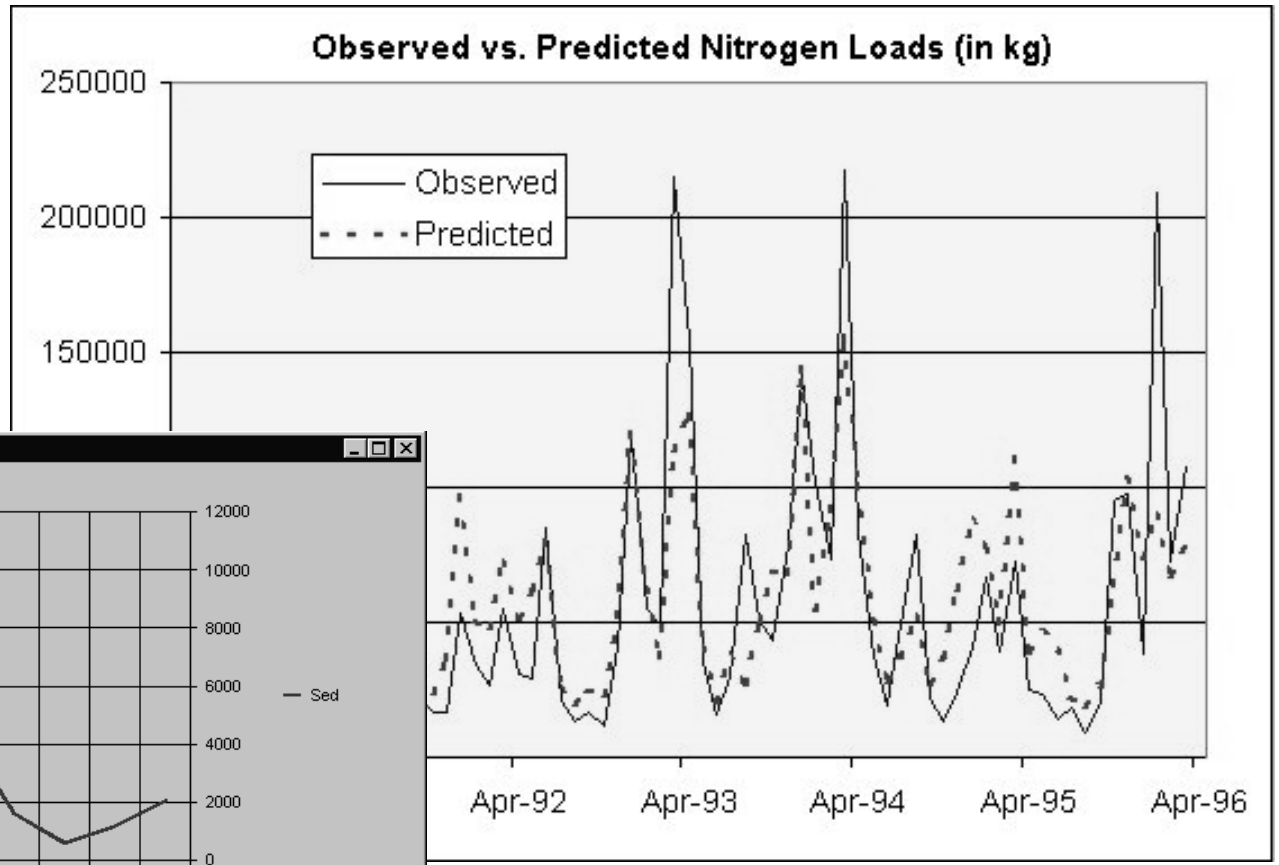
Source	(Ha) Area	(cm) Runoff	Mg (1000 Kg) Erosion	Mg (1000 Kg) Sediment	Total Loads (Kg) Dis. Nitr.	Total Loads (Kg) Tot. Nitr.	Total Loads (Kg) Dis. Phos.	Total Loads (Kg) Tot. Phos.
HAY/PAST	5286	7.84	1672.41	115.4	10621.53	10967.72	1377.37	1448.57
CROPLAND	16654	14.15	54859.61	3785.31	60642.26	71998.2	7736.03	10071.56
CONIF_FOR	739	6.62	11.63	0.8	92.91	95.32	2.93	3.43
MIXED_FOR	4204	6.62	94.17	6.5	528.54	548.03	16.69	20.7
DECID_FOR	15158	6.62	564.04	38.92	1905.7	2022.46	60.18	84.19
UNPAVED_RD	7	21.84	44.84	3.09	44.34	53.62	3.06	4.97
QUARRY	102	26.19	561.7	38.76	3.21	119.48	0.51	24.42
COAL_MINES	61	21.84	241.23	16.65	1.6	51.53	0.25	10.52
TRANSITION	59	21.84	218.44	15.07	373.71	418.92	25.77	35.07
LO_INT_DEV	8602	15.42	3070.11	211.84	0.0	10424.05	0.0	1389.87
HI_INT_DEV	2172	38.8	493.03	34.02	0.0	5674.65	0.0	629.27
Stream Bank				48894.6		73341.9		15084.0
Groundwater					248086.79	248086.79	12190.22	12190.22
Point Sources					223072.8	223072.8	13096.56	13096.56
Septic Syst.					55503.15	55503.15	307.58	307.58
Totals	53044	11.9	61831.2	53161.0	600876.53	702378.61	34817.15	54400.92

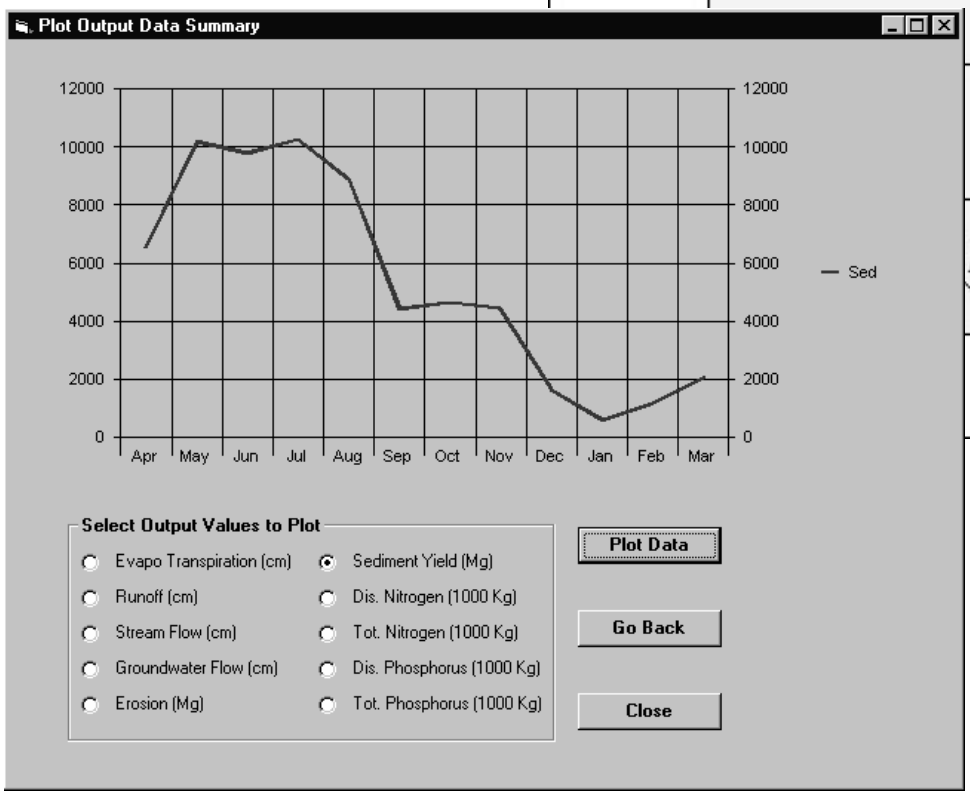
Go Back | Print | Export to Jpeg | Close

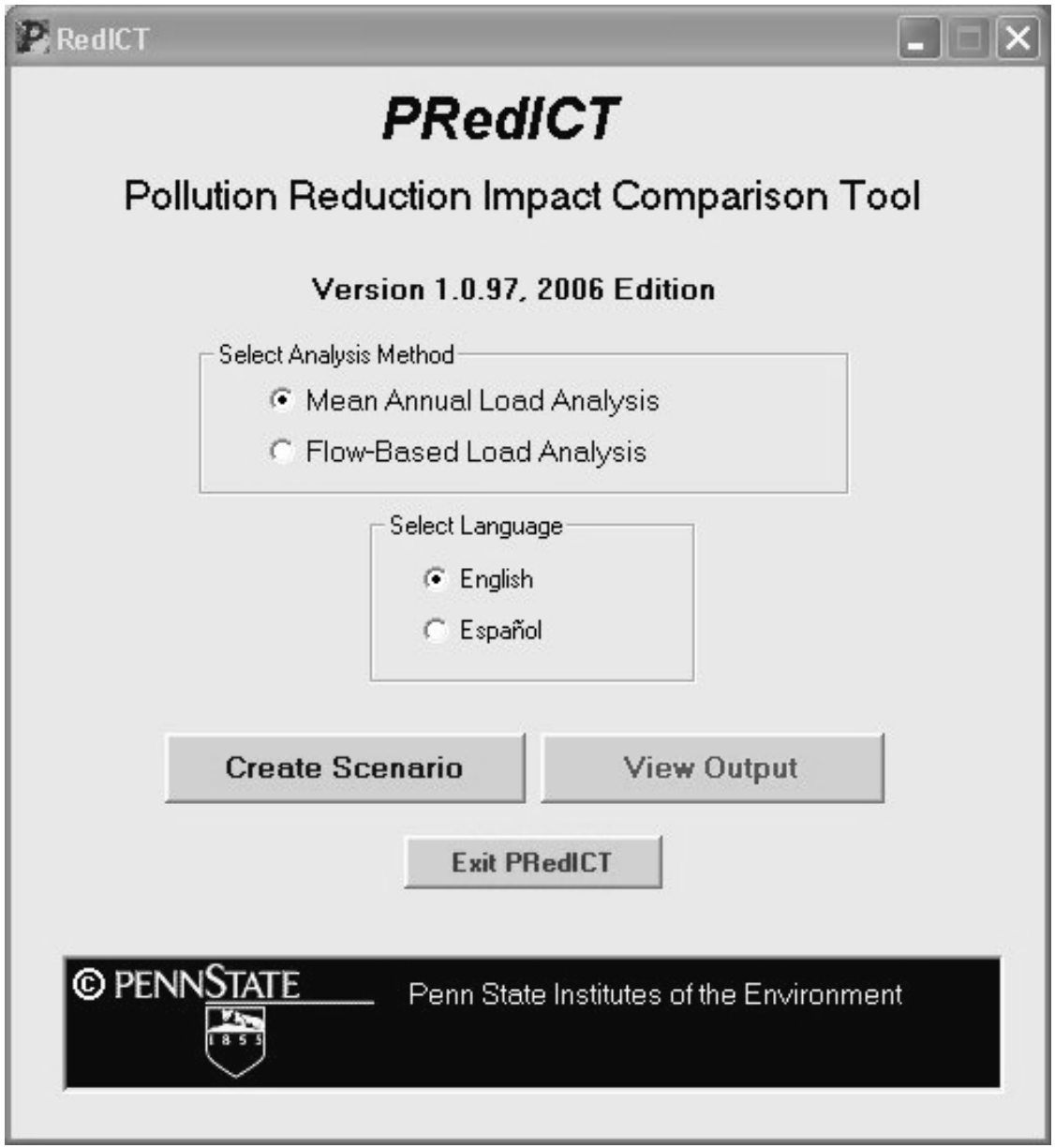
Model Calibration



Data Visualization Options






RedICT
PRedICT
Pollution Reduction Impact Comparison Tool
Version 1.0.97, 2006 Edition
Select Analysis Method
Mean Annual Load Analysis
Flow-Based Load Analysis
Select Language
English
Español
Create Scenario
View Output
Exit PRedICT
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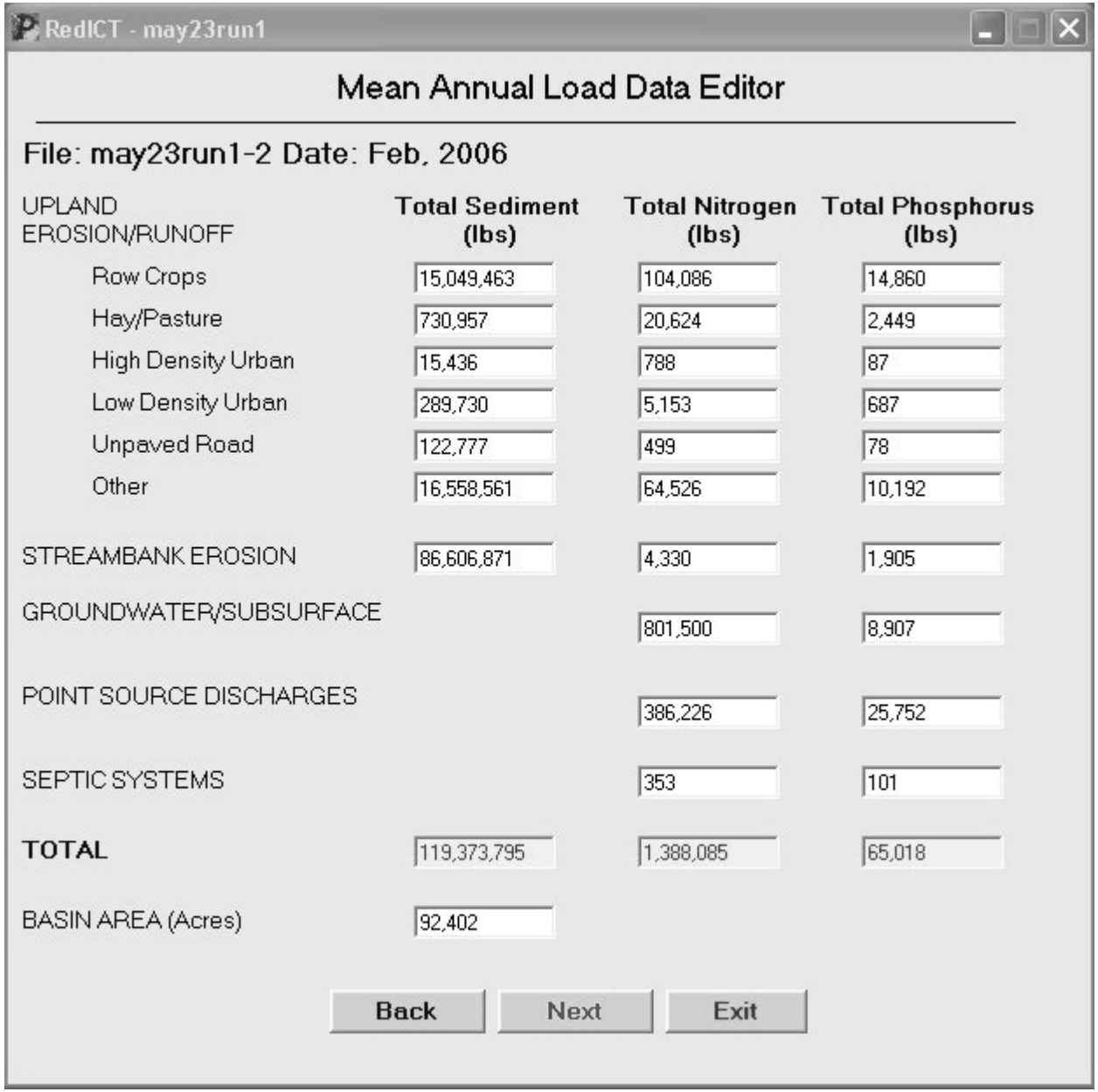
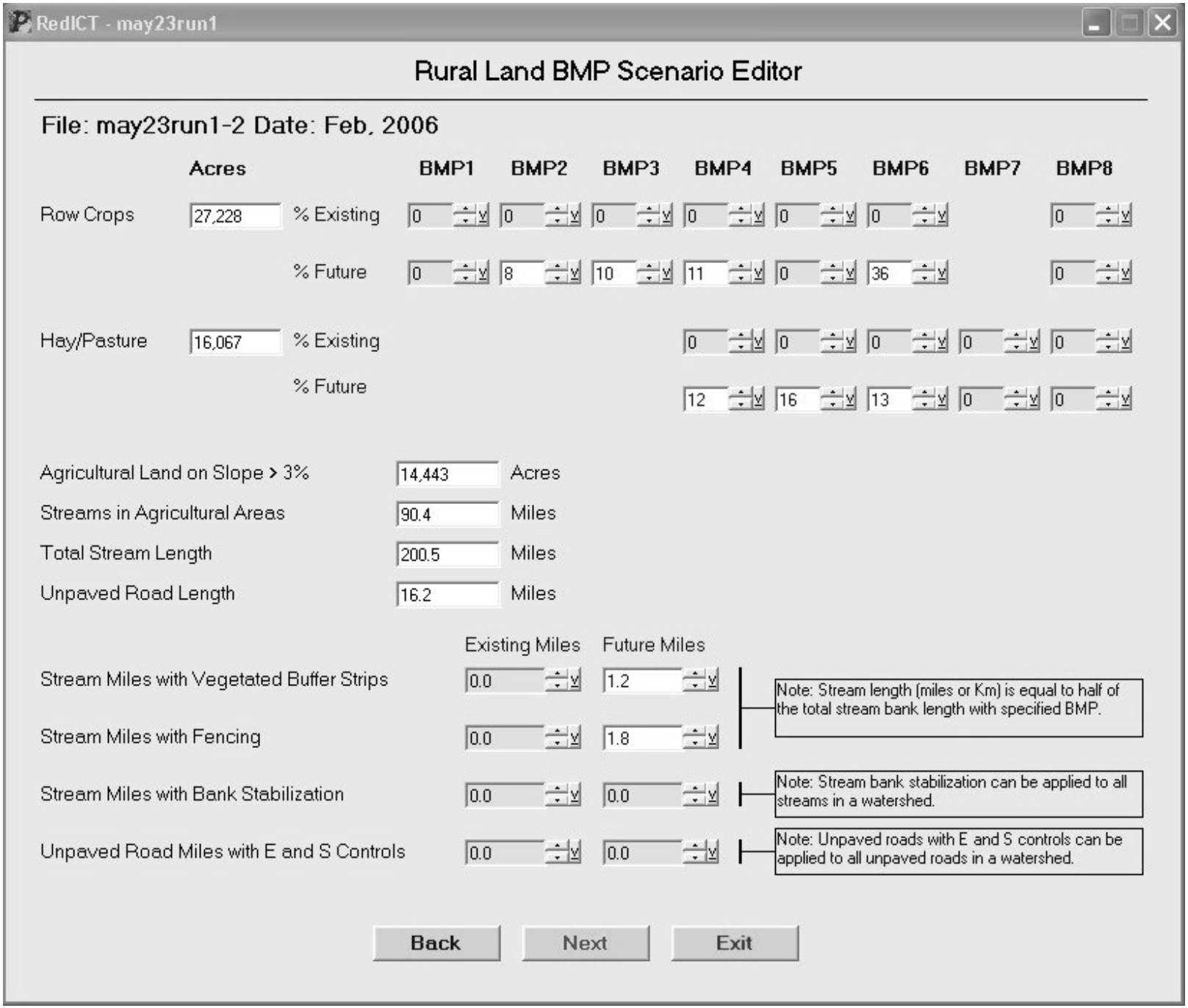
1855
Penn State Institutes of the Environment


RedICT - may23run1
Mean Annual Load Data Editor
File: may23run1-2 Date: Feb, 2006
UPLAND EROSION/RUNOFF
Total Sediment (lbs)
Total Nitrogen (lbs)
Total Phosphorus (lbs)
Row Crops
15,049,463
104,086
14,860
Hay/Pasture
730,957
20,624
2,449
High Density Urban
15,436
788
87
Low Density Urban
289,730
5,153
687
Unpaved Road
122,777
499
78
Other
16,558,561
64,526
10,192
STREAMBANK EROSION
86,606,871
4,330
1,905
GROUNDWATER/SUBSURFACE
801,500
8,907
POINT SOURCE DISCHARGES
386,226
25,752
SEPTIC SYSTEMS
353
101
TOTAL
119,373,795
1,388,085
65,018
BASIN AREA (Acres)
92,402
Back
Next
Exit


RedICT - may23run1
Rural Land BMP Scenario Editor
File: may23run1-2 Date: Feb, 2006
Acres
BMP1
BMP2
BMP3
BMP4
BMP5
BMP6
BMP7
BMP8
Row Crops
27,228
% Existing
0
0
0
0
0
0
0
% Future
0
8
10
11
0
36
0
Hay/Pasture
16,067
% Existing
0
0
0
0
0
% Future
12
16
13
0
0
Agricultural Land on Slope > 3%
14,443
Acres
Streams in Agricultural Areas
90.4
Miles
Total Stream Length
200.5
Miles
Unpaved Road Length
16.2
Miles
Existing Miles
Future Miles
Stream Miles with Vegetated Buffer Strips
0.0
1.2
Stream Miles with Fencing
0.0
1.8
Note: Stream length (miles or Km) is equal to half of the total stream bank length with specified BMP.
Stream Miles with Bank Stabilization
0.0
0.0
Note: Stream bank stabilization can be applied to all streams in a watershed.
Unpaved Road Miles with E and S Controls
0.0
0.0
Note: Unpaved roads with E and S controls can be applied to all unpaved roads in a watershed.
Back
Next
Exit

File: ScnTestA-1 Date: Feb, 2005

Urban Land BMP Scenario Editor

Hi Density Urban

Acres: 40 | % Impervious Surface: 50.0

Constructed Wetlands		Bioretention Areas		Detention Basin	
% Existing	0	% Existing	0	% Existing	0
% Future	0	% Future	12	% Future	0
% Drainage Area Used	5.0	% Drainage Area Used	6.0	% Drainage Area Used	3.0
Impervious Acres Drained	0.0	Impervious Acres Drained	2.4	Impervious Acres Drained	0.0
CW Acres Required	0.0	BA Acres Required	0.3	DB Acres Required	0.0

Low Density Urban

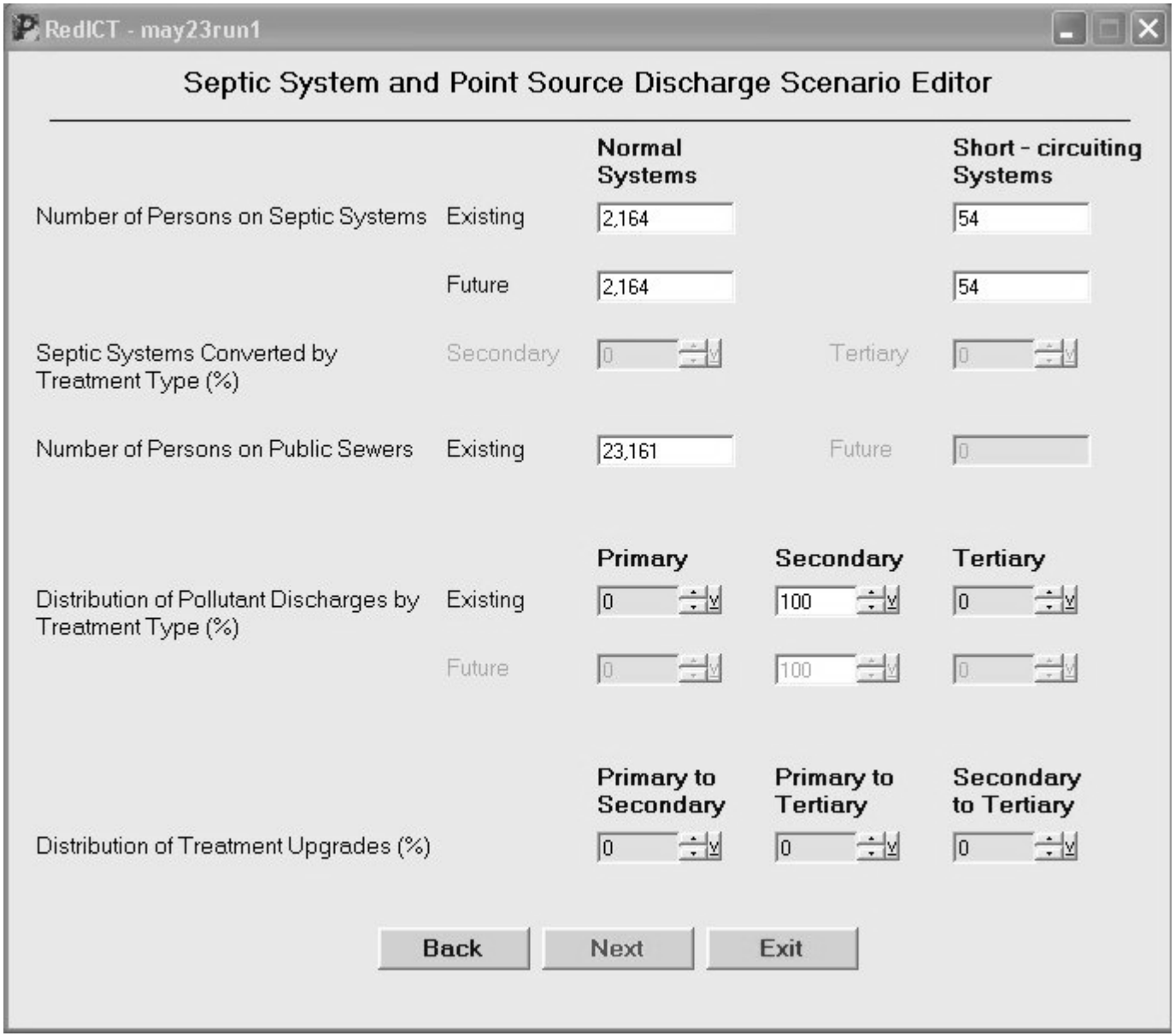
Acres: 5,271 | % Impervious Surface: 25.0

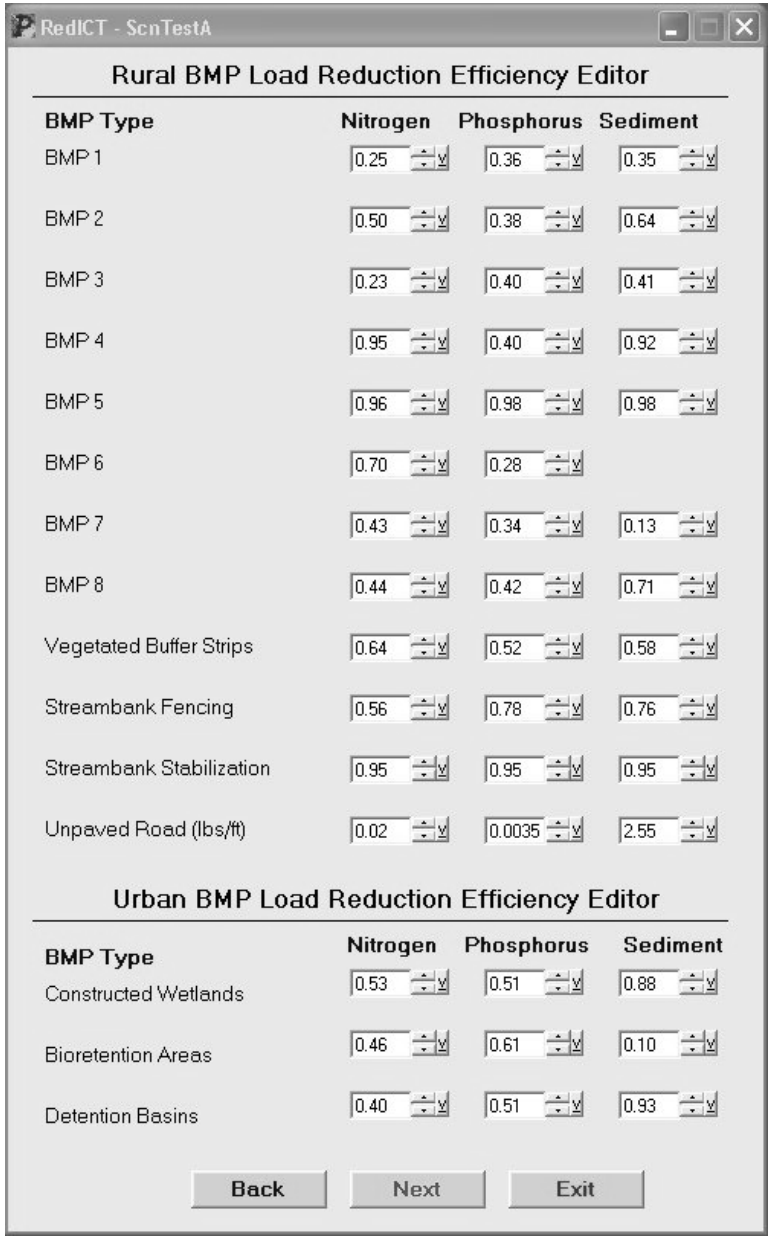
Constructed Wetlands		Bioretention Areas		Detention Basin	
% Existing	0	% Existing	0	% Existing	0
% Future	0	% Future	0	% Future	0
% Drainage Area Used	3.0	% Drainage Area Used	6.0	% Drainage Area Used	2.0
Impervious Acres Drained	0.0	Impervious Acres Drained	0.0	Impervious Acres Drained	0.0
CW Acres Required	0.0	CW Acres Required	0.0	DB Acres Required	0.0

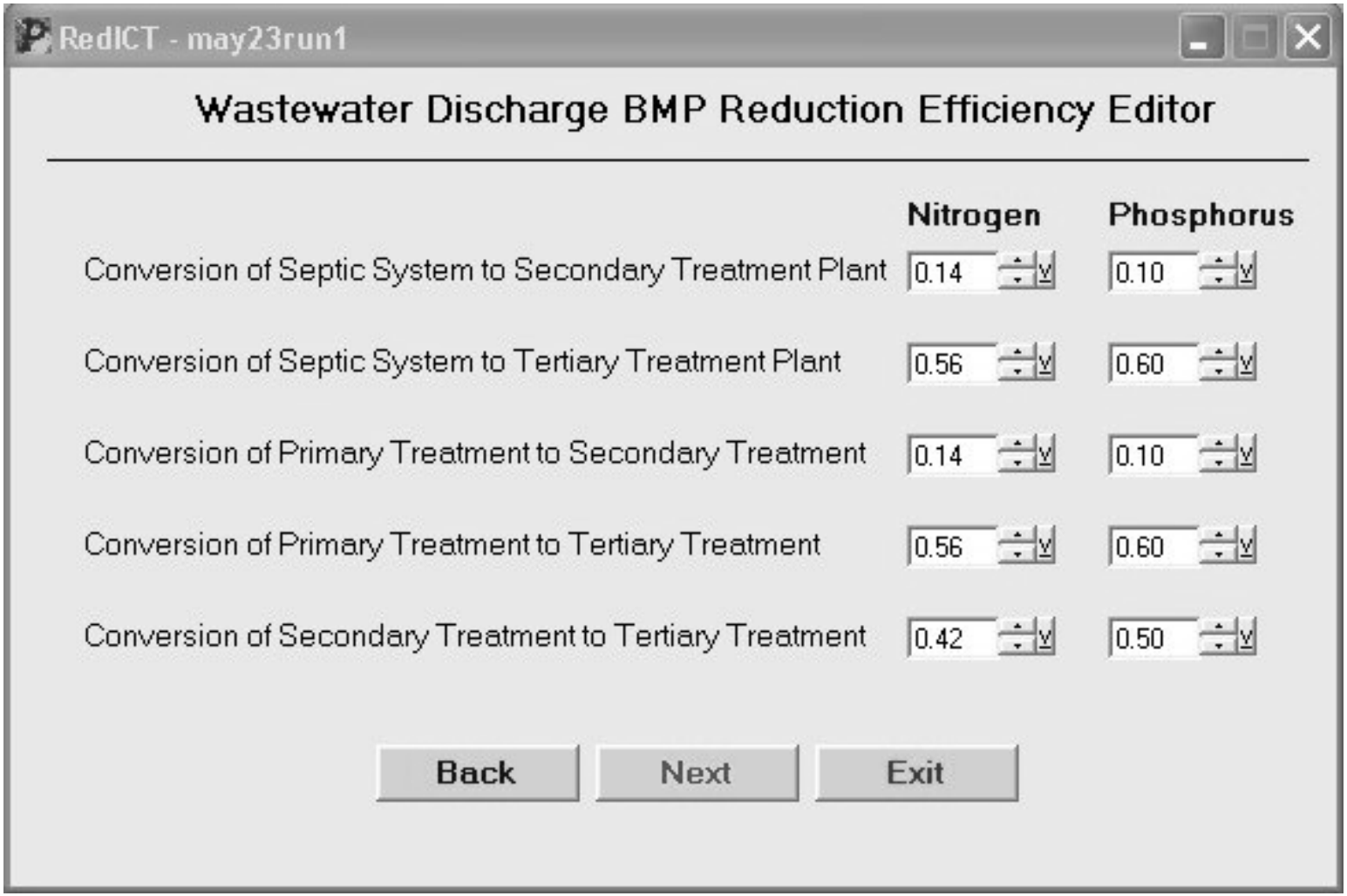
Stream Protection

			Existing	Future
Stream miles in high density urban areas	0	Stream miles in high density urban areas w/buffers	0	0
		High density urban Streambank Stabilization	0	0
Stream miles in low density urban areas	6	Stream miles in low density urban areas w/buffers	0	0
		Low density urban Streambank Stabilization	0	0

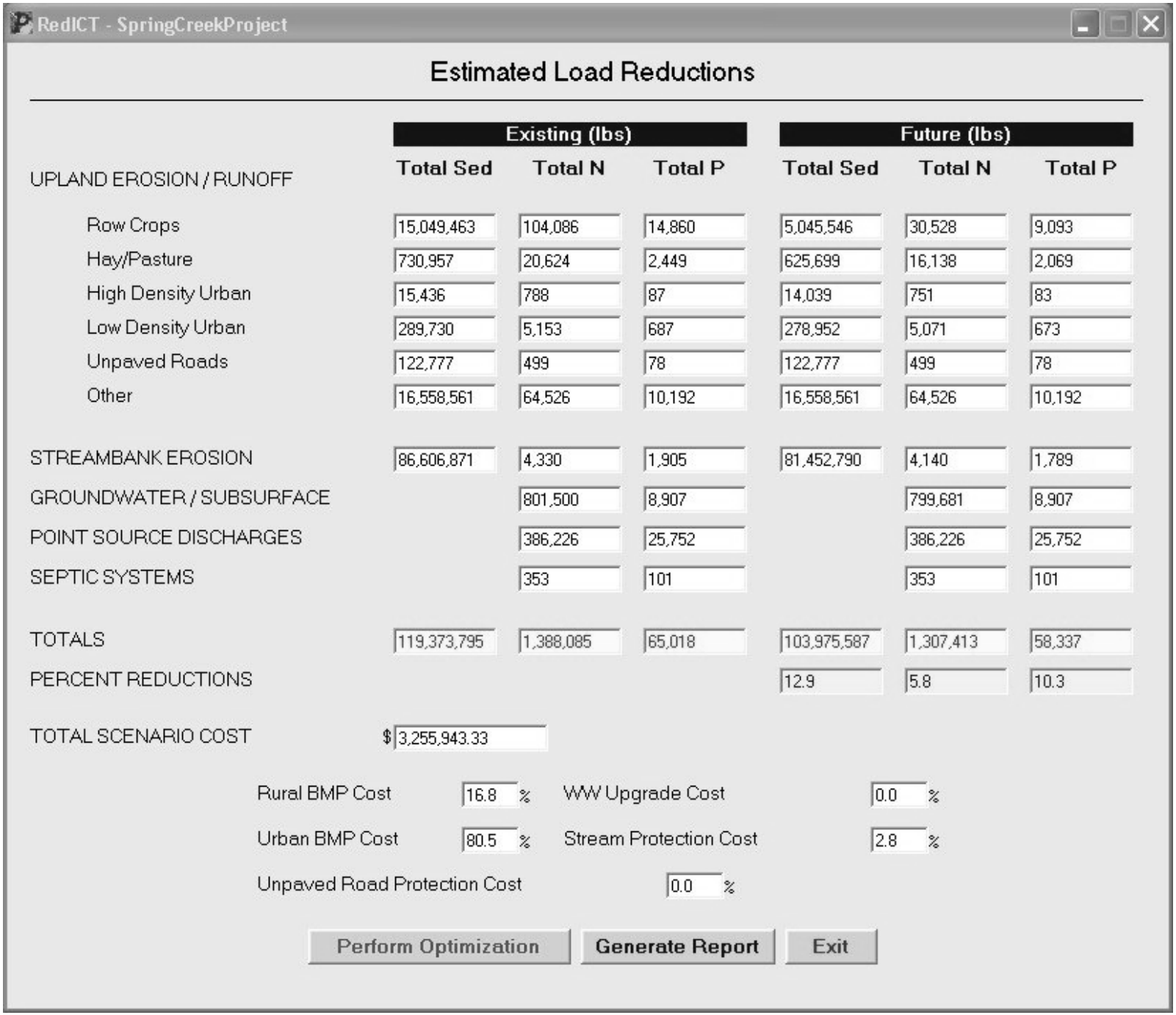
Back | Next | Exit


RedICT - may23run1
Septic System and Point Source Discharge Scenario Editor
Normal Systems
Short - circuiting Systems
Number of Persons on Septic Systems
Existing
2,164
54
Future
2,164
54
Septic Systems Converted by Treatment Type (%)
Secondary
0
Tertiary
0
Number of Persons on Public Sewers
Existing
23,161
Future
0
Primary
Secondary
Tertiary
Distribution of Pollutant Discharges by Treatment Type (%)
Existing
0
100
0
Future
0
100
0
Primary to Secondary
Primary to Tertiary
Secondary to Tertiary
Distribution of Treatment Upgrades (%)
0
0
0
Back
Next
Exit

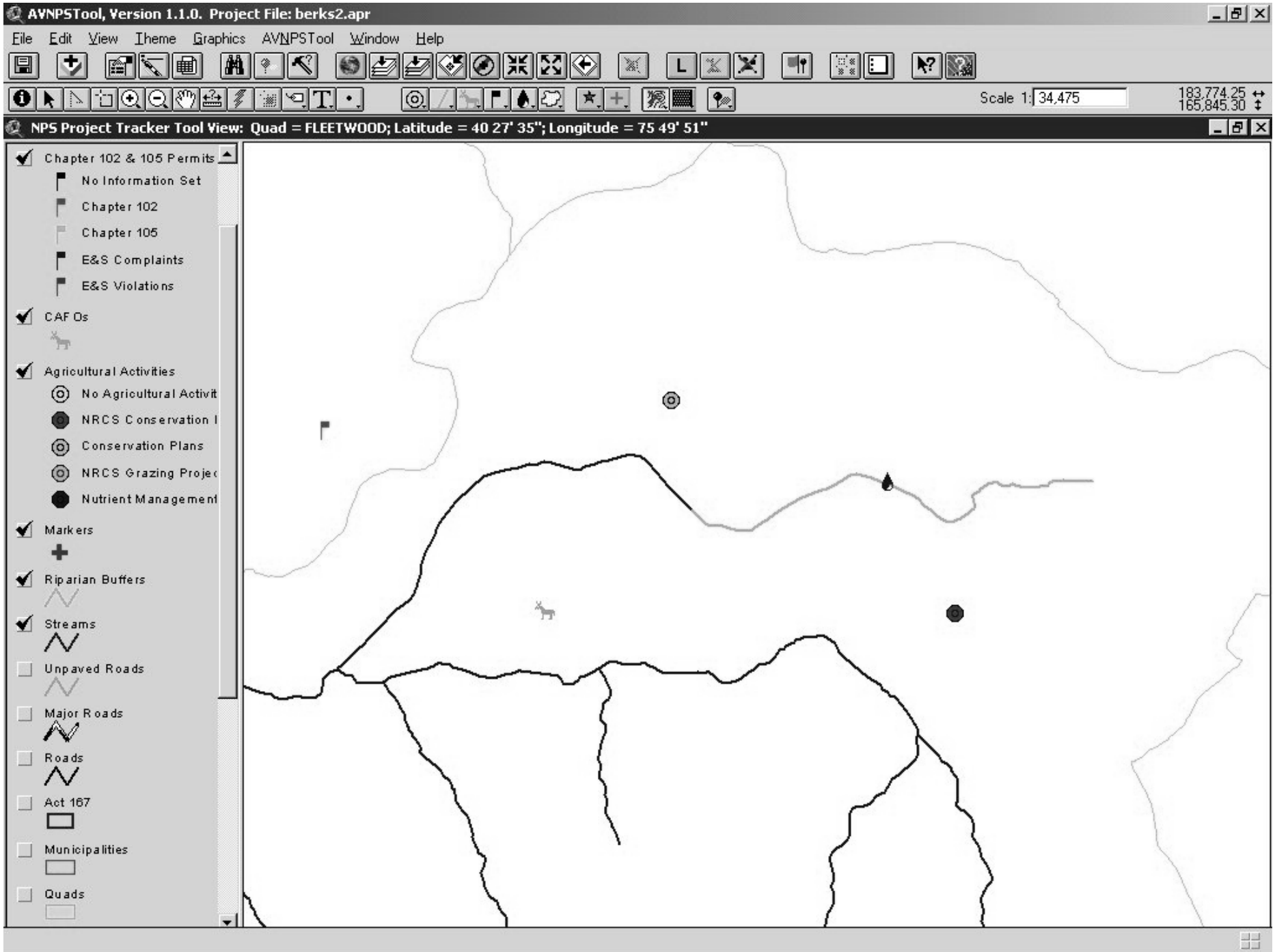

RedICT - ScnTestA
Rural BMP Load Reduction Efficiency Editor
BMP Type
Nitrogen
Phosphorus
Sediment
BMP 1
0.25
0.36
0.35
BMP 2
0.50
0.38
0.64
BMP 3
0.23
0.40
0.41
BMP 4
0.95
0.40
0.92
BMP 5
0.96
0.98
0.98
BMP 6
0.70
0.28
BMP 7
0.43
0.34
0.13
BMP 8
0.44
0.42
0.71
Vegetated Buffer Strips
0.64
0.52
0.58
Streambank Fencing
0.56
0.78
0.76
Streambank Stabilization
0.95
0.95
0.95
Unpaved Road (lbs/ft)
0.02
0.0035
2.55
Urban BMP Load Reduction Efficiency Editor
BMP Type
Nitrogen
Phosphorus
Sediment
Constructed Wetlands
0.53
0.51
0.88
Bioretention Areas
0.46
0.61
0.10
Detention Basins
0.40
0.51
0.93
Back
Next
Exit

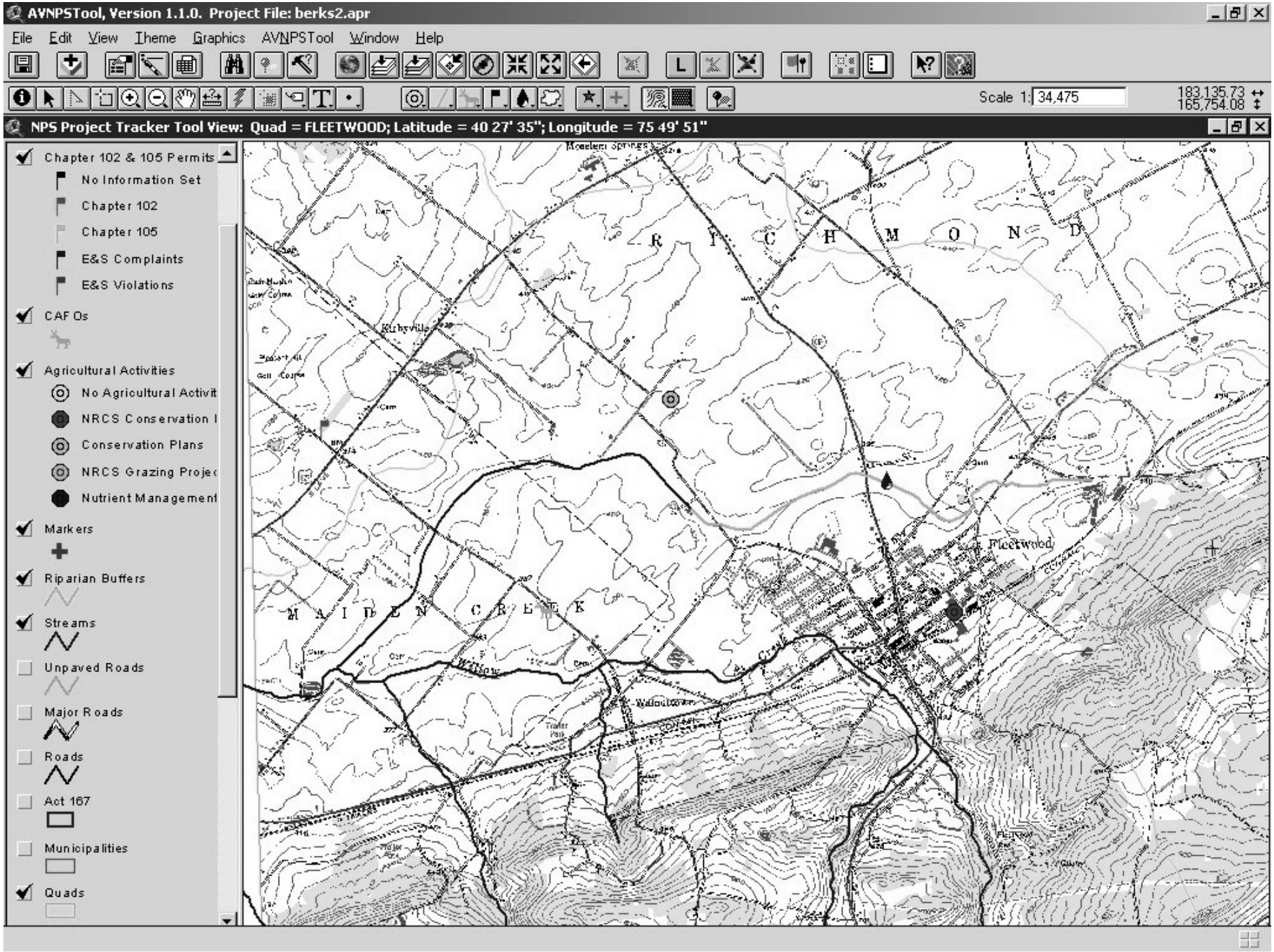

RedICT - may23run1
Wastewater Discharge BMP Reduction Efficiency Editor
Nitrogen
Phosphorus
Conversion of Septic System to Secondary Treatment Plant
0.14
0.10
Conversion of Septic System to Tertiary Treatment Plant
0.56
0.60
Conversion of Primary Treatment to Secondary Treatment
0.14
0.10
Conversion of Primary Treatment to Tertiary Treatment
0.56
0.60
Conversion of Secondary Treatment to Tertiary Treatment
0.42
0.50
Back
Next
Exit

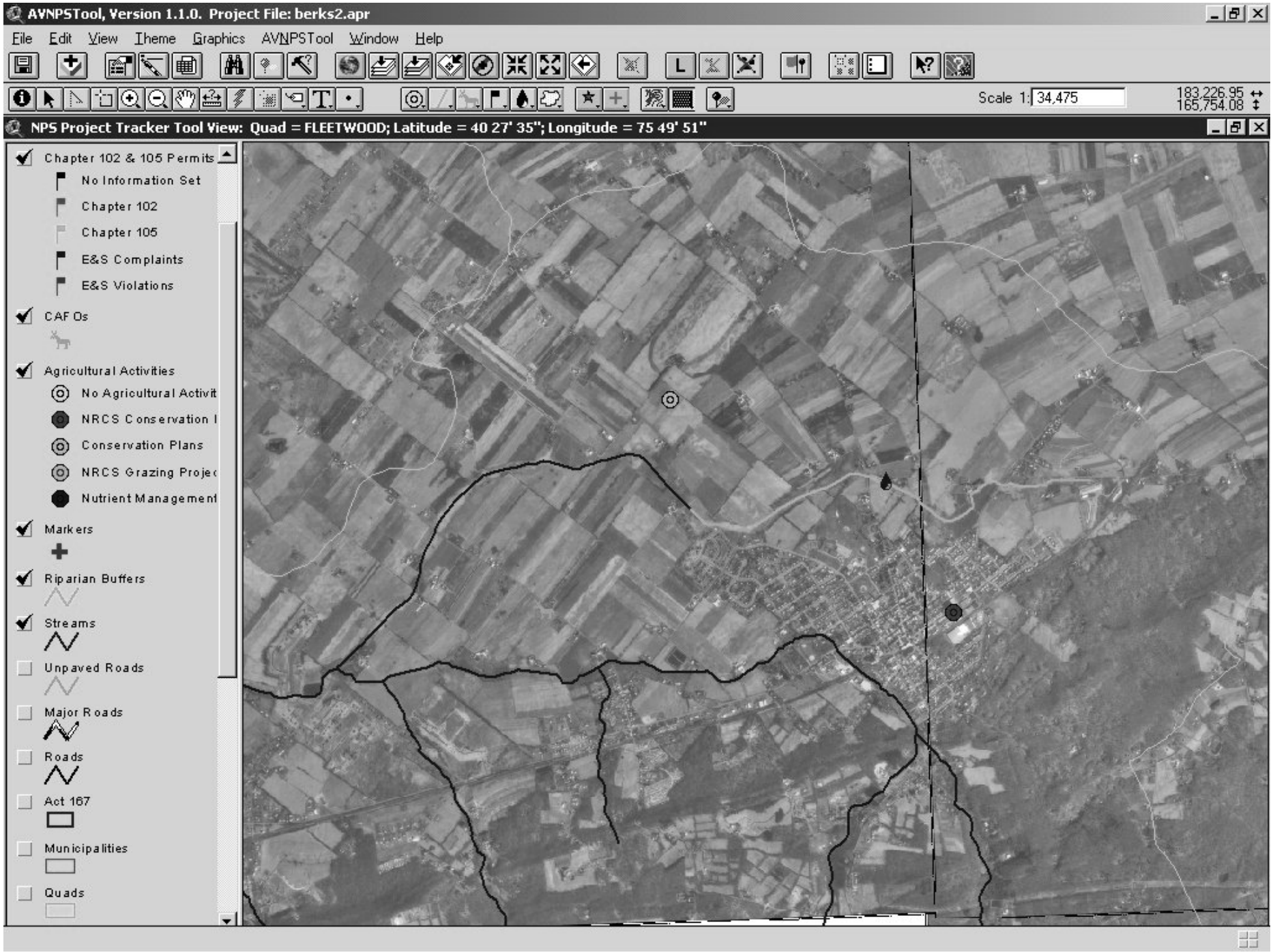

RedICT - ScnTestA
BMP Cost Editor
Rural BMPs
Conservation Tillage (per acre) $ 30.00
Cropland Protection (per acre) $ 25.00
Grazing Land Management (per acre) $ 360.00
Strip Cropping/Contour Farming (per acre) $ 10.00
Streambank Fencing (per mile) $ 15,000.00
Streambank Stabilization (per foot) $ 25.00
Vegetated Buffer Strip (per mile) $ 1,500.00
Terraces and Diversions (per acre) $ 500.00
Nutrient Management (per acre) $ 110.00
Unpaved Road (per foot) $ 5.58
Ag to Forest (per acre) $ 5,000.00
Ag to Wetland (per acre) 5,000.00
Urban BMPs*
Constructed Wetlands $ 13,400.00
Bioretention Areas $ 8,000.00
Detention Basin $ 10,700.00
*(costs are per impervious acre drained)
Septic System and Point Source Upgrades
Conversion of Septic Systems to Centralized Sewage Treatment (per home) $ 15,000.00
Conversion from Primary to Secondary Sewage Treatment (per capita) $ 250.00
Conversion from Secondary to Tertiary Sewage Treatment (per capita) $ 300.00
Conversion from Primary to Tertiary Sewage Treatment (per capita) $ 150.00
Scenario File Name
Test2
d: [...]
D:\
ERRI
PRedICT
ScnData
Project Name
Spring Creek Project
Back
Run
Exit

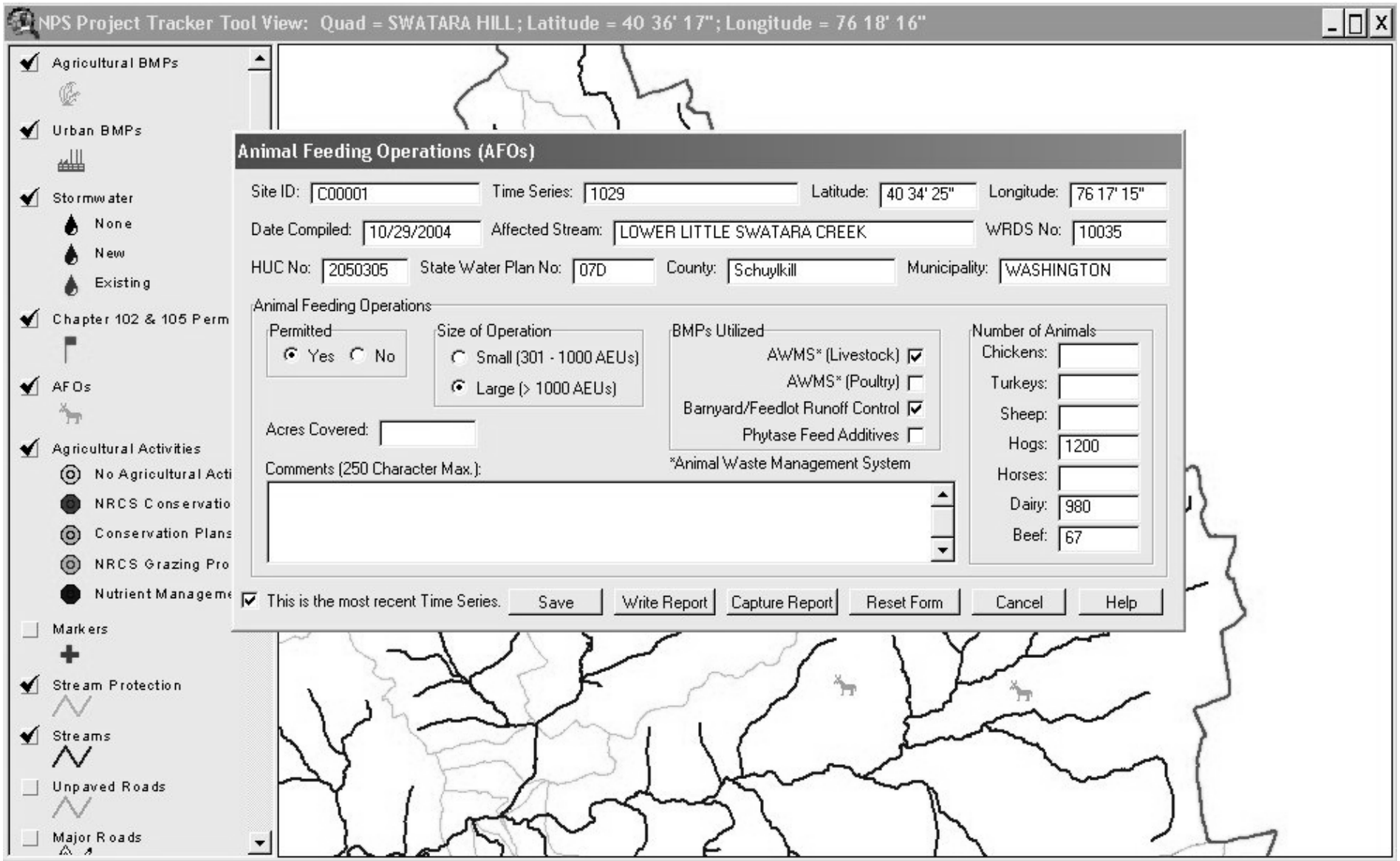

RedICT - SpringCreekProject
Estimated Load Reductions
Existing (lbs)
Future (lbs)
UPLAND EROSION / RUNOFF
Total Sed
Total N
Total P
Total Sed
Total N
Total P
Row Crops
15,049,463
104,086
14,860
5,045,546
30,528
9,093
Hay/Pasture
730,957
20,624
2,449
625,699
16,138
2,069
High Density Urban
15,436
788
87
14,039
751
83
Low Density Urban
289,730
5,153
687
278,952
5,071
673
Unpaved Roads
122,777
499
78
122,777
499
78
Other
16,558,561
64,526
10,192
16,558,561
64,526
10,192
STREAMBANK EROSION
86,606,871
4,330
1,905
81,452,790
4,140
1,789
GROUNDWATER / SUBSURFACE
801,500
8,907
799,681
8,907
POINT SOURCE DISCHARGES
386,226
25,752
386,226
25,752
SEPTIC SYSTEMS
353
101
353
101
TOTALS
119,373,795
1,388,085
65,018
103,975,587
1,307,413
58,337
PERCENT REDUCTIONS
12.9
5.8
10.3
TOTAL SCENARIO COST
$ 3,255,943.33
Rural BMP Cost
16.8 %
WW Upgrade Cost
0.0 %
Urban BMP Cost
80.5 %
Stream Protection Cost
2.8 %
Unpaved Road Protection Cost
0.0 %
Perform Optimization
Generate Report
Exit

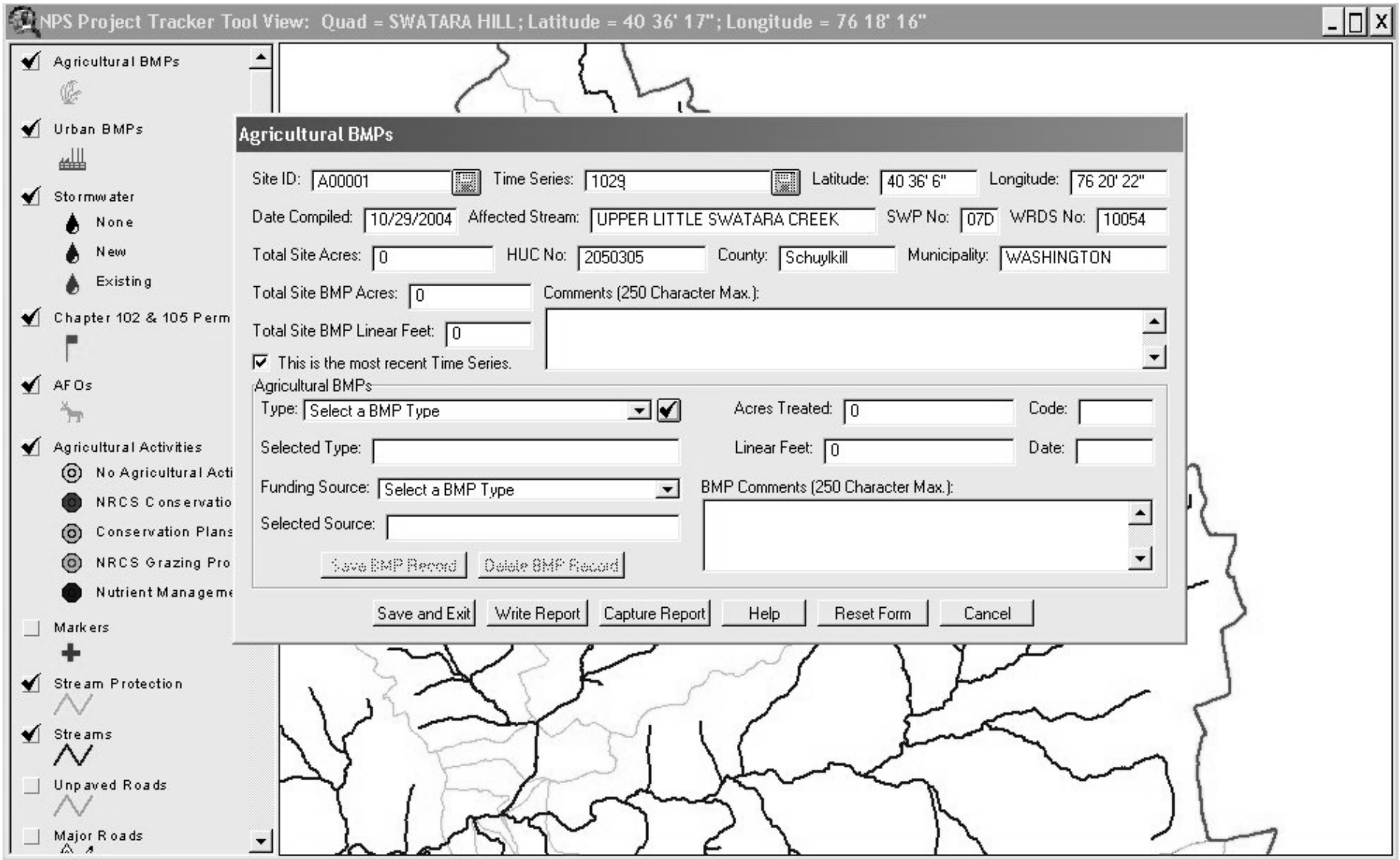
GIS-based NPS Tracking Tool

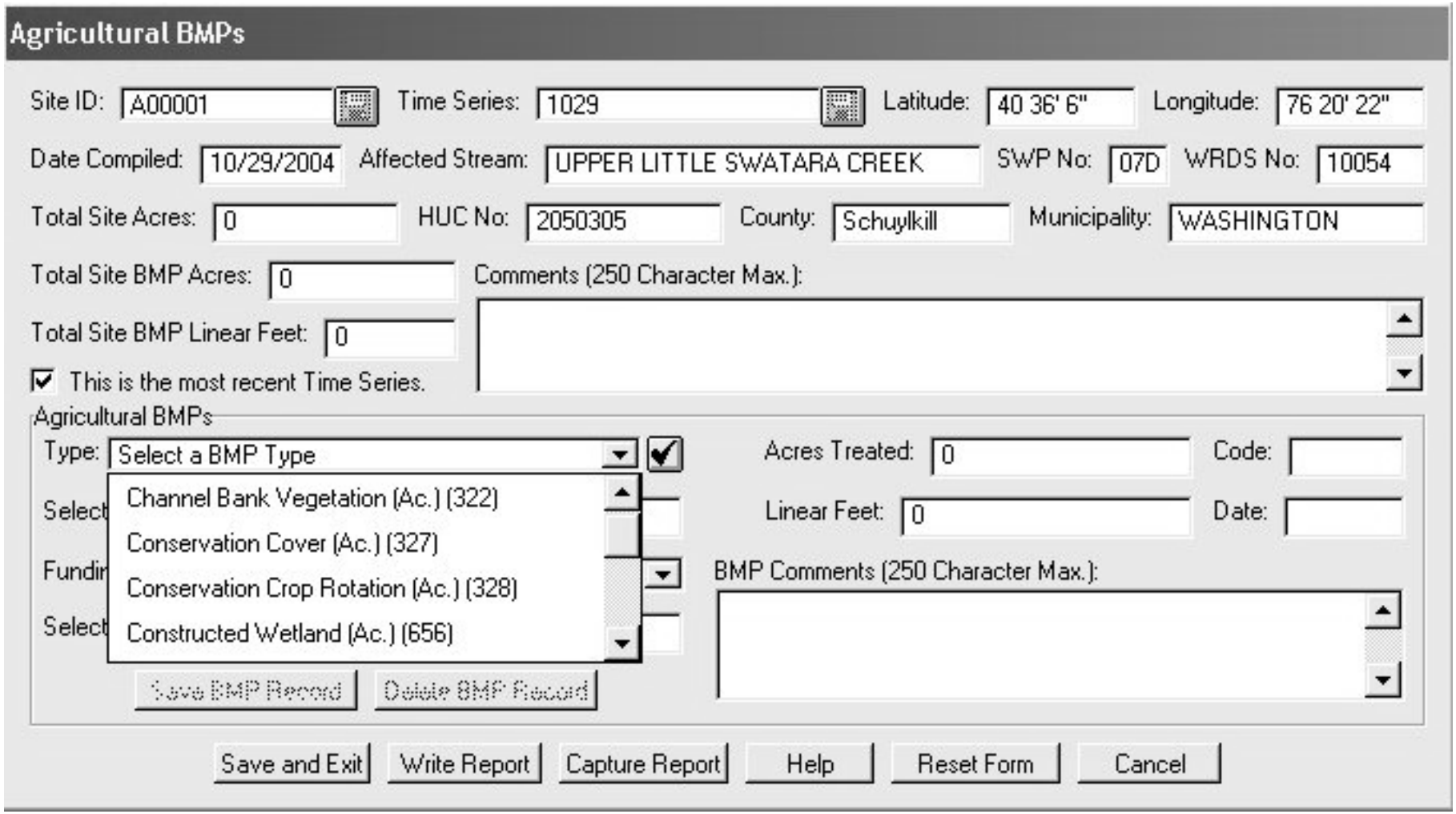

AVNPSTool, Version 1.1.0. Project File: berks2.apr
File Edit View Theme Graphics AVNPSTool Window Help
Scale 1: 34,475
183,774.25
165,845.30
NPS Project Tracker Tool View: Quad = FLEETWOOD; Latitude = 40 27' 35"; Longitude = 75 49' 51"
Chapter 102 & 105 Permits
No Information Set
Chapter 102
Chapter 105
E&S Complaints
E&S Violations
CAFOs
Agricultural Activities
No Agricultural Activit
NRCS Conservation I
Conservation Plans
NRCS Grazing Projec
Nutrient Management
Markers
Riparian Buffers
Streams
Unpaved Roads
Major Roads
Roads
Act 167
Municipalities
Quads

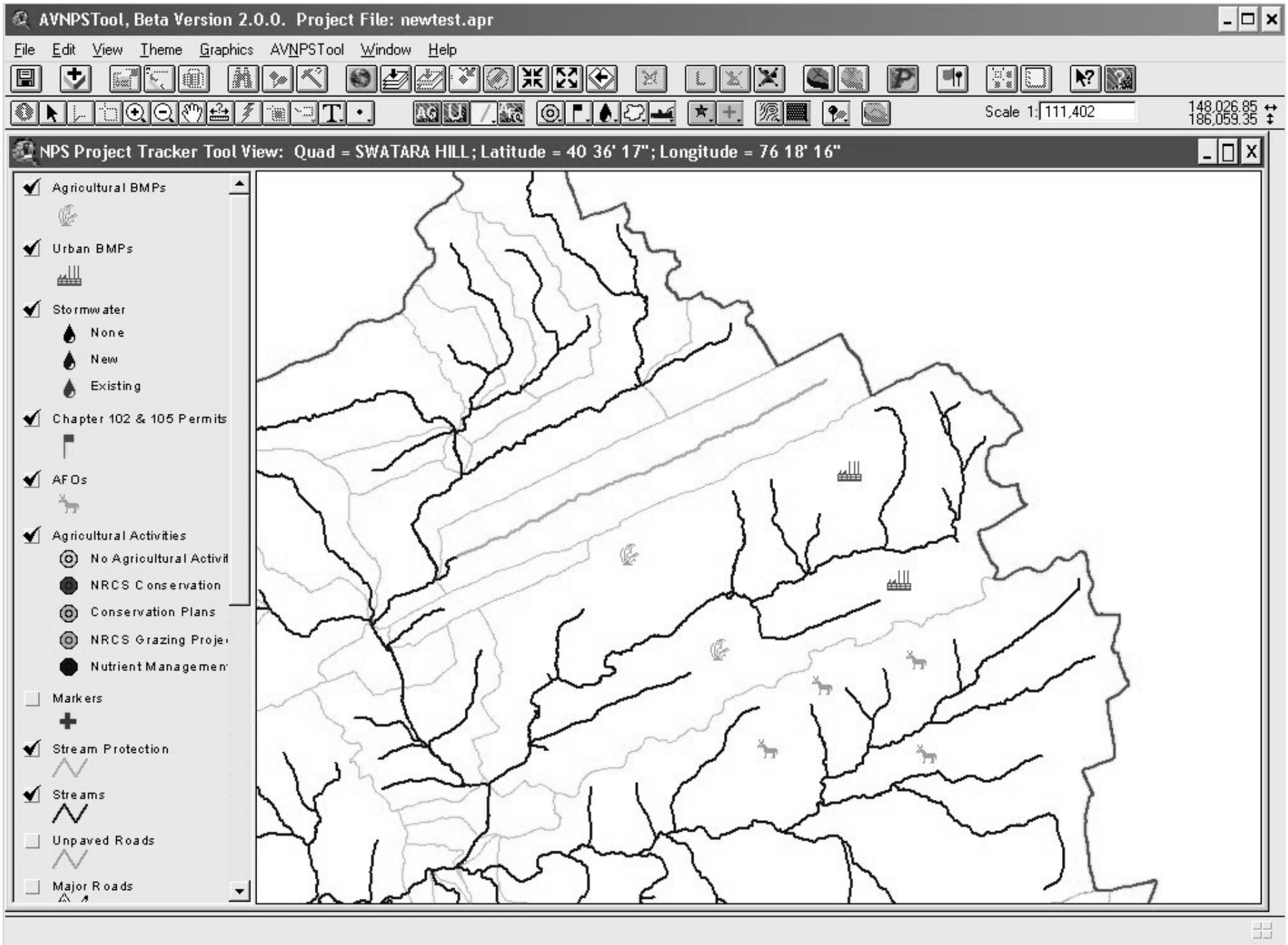

AVNPSTool, Version 1.1.0. Project File: berks2.apr
File Edit View Theme Graphics AVNPSTool Window Help
Scale 1: 34,475
183,135.73
165,754.08
NPS Project Tracker Tool View: Quad = FLEETWOOD; Latitude = 40 27' 35"; Longitude = 75 49' 51"
Chapter 102 & 105 Permits
No Information Set
Chapter 102
Chapter 105
E&S Complaints
E&S Violations
CAFOs
Agricultural Activities
No Agricultural Activit
NRCS Conservation I
Conservation Plans
NRCS Grazing Projec
Nutrient Management
Markers
Riparian Buffers
Streams
Unpaved Roads
Major Roads
Roads
Act 167
Municipalities
Quads
R I C H M O N D
M A I D E N C R E E K
Fleetwood


AVNPSTool, Version 1.1.0. Project File: berks2.apr
File Edit View Theme Graphics AVNPSTool Window Help
Scale 1: 34,475
183,226.95
165,754.08
NPS Project Tracker Tool View: Quad = FLEETWOOD; Latitude = 40 27' 35"; Longitude = 75 49' 51"
Chapter 102 & 105 Permits
No Information Set
Chapter 102
Chapter 105
E&S Complaints
E&S Violations
CAFOs
Agricultural Activities
No Agricultural Activit
NRCS Conservation I
Conservation Plans
NRCS Grazing Projec
Nutrient Management
Markers
Riparian Buffers
Streams
Unpaved Roads
Major Roads
Roads
Act 167
Municipalities
Quads


NPS Project Tracker Tool View: Quad = SWATARA HILL; Latitude = 40 36' 17"; Longitude = 76 18' 16"
Agricultural BMPs
Urban BMPs
Stormwater
None
New
Existing
Chapter 102 & 105 Perm
AFOs
Agricultural Activities
No Agricultural Acti
NRCS Conservatio
Conservation Plans
NRCS Grazing Pro
Nutrient Manageme
Markers
Stream Protection
Streams
Unpaved Roads
Major Roads
Animal Feeding Operations (AFOs)
Site ID: C00001
Time Series: 1029
Latitude: 40 34' 25"
Longitude: 76 17' 15"
Date Compiled: 10/29/2004
Affected Stream: LOWER LITTLE SWATARA CREEK
WRDS No: 10035
HUC No: 2050305
State Water Plan No: 07D
County: Schuylkill
Municipality: WASHINGTON
Animal Feeding Operations
Permitted
Yes
No
Size of Operation
Small (301 - 1000 AEUs)
Large (> 1000 AEUs)
BMPs Utilized
AWMS* (Livestock)
AWMS* (Poultry)
Barnyard/Feedlot Runoff Control
Phytase Feed Additives
*Animal Waste Management System
Number of Animals
Chickens:
Turkeys:
Sheep:
Hogs: 1200
Horses:
Dairy: 980
Beef: 67
Acres Covered:
Comments (250 Character Max.):
This is the most recent Time Series.
Save
Write Report
Capture Report
Reset Form
Cancel
Help


NPS Project Tracker Tool View: Quad = SWATARA HILL; Latitude = 40 36' 17"; Longitude = 76 18' 16"
Agricultural BMPs
Urban BMPs
Stormwater
None
New
Existing
Chapter 102 & 105 Perm
AFOs
Agricultural Activities
No Agricultural Acti
NRCS Conservatio
Conservation Plans
NRCS Grazing Pro
Nutrient Manageme
Markers
Stream Protection
Streams
Unpaved Roads
Major Roads
Agricultural BMPs
Site ID: A00001
Time Series: 1029
Latitude: 40 36' 6"
Longitude: 76 20' 22"
Date Compiled: 10/29/2004
Affected Stream: UPPER LITTLE SWATARA CREEK
SWP No: 07D
WRDS No: 10054
Total Site Acres: 0
HUC No: 2050305
County: Schuylkill
Municipality: WASHINGTON
Total Site BMP Acres: 0
Comments (250 Character Max.):
Total Site BMP Linear Feet: 0
This is the most recent Time Series.
Agricultural BMPs
Type: Select a BMP Type
Acres Treated: 0
Code:
Selected Type:
Linear Feet: 0
Date:
Funding Source: Select a BMP Type
BMP Comments (250 Character Max.):
Selected Source:
Save BMP Record
Delete BMP Record
Save and Exit
Write Report
Capture Report
Help
Reset Form
Cancel


Agricultural BMPs
Site ID: A00001
Time Series: 1029
Latitude: 40 36' 6"
Longitude: 76 20' 22"
Date Compiled: 10/29/2004
Affected Stream: UPPER LITTLE SWATARA CREEK
SWP No: 07D
WRDS No: 10054
Total Site Acres: 0
HUC No: 2050305
County: Schuylkill
Municipality: WASHINGTON
Total Site BMP Acres: 0
Comments (250 Character Max.):
Total Site BMP Linear Feet: 0
This is the most recent Time Series.
Agricultural BMPs
Type: Select a BMP Type
Channel Bank Vegetation (Ac.) (322)
Conservation Cover (Ac.) (327)
Conservation Crop Rotation (Ac.) (328)
Constructed Wetland (Ac.) (656)
Acres Treated: 0
Code:
Linear Feet: 0
Date:
BMP Comments (250 Character Max.):
Save BMP Record
Delete BMP Record
Save and Exit
Write Report
Capture Report
Help
Reset Form
Cancel


AVNPSTool, Beta Version 2.0.0. Project File: newtest.apr
File Edit View Theme Graphics AVNPSTool Window Help
Scale 1: 111,402
148,026.85
186,059.35
NPS Project Tracker Tool View: Quad = SWATARA HILL; Latitude = 40 36' 17"; Longitude = 76 18' 16"
Agricultural BMPs
Urban BMPs
Stormwater
None
New
Existing
Chapter 102 & 105 Permits
AFOs
Agricultural Activities
No Agricultural Activit
NRCS Conservation
Conservation Plans
NRCS Grazing Proje
Nutrient Managemen
Markers
Stream Protection
Streams
Unpaved Roads
Major Roads

Stream Protection

Site ID: R00001 | Time Series: 1029 | Latitude: 40 37' 6" | Longitude: 76 20' 8"

Date Compiled: 10/29/2004 | Affected Stream: BLACK CREEK | WRDS No: 10077

HUC No: 2050305 | State Water Plan No: 07D | County: Schuylkill | Municipality: REILLY

Select Stream Protection Activities (Choose All That Apply)

- [x] Riparian Buffer (Grass)
- [ ] Riparian Buffer (Forested)
- [x] Streambank Fencing
- [ ] Streambank Stabilization

Stream Length

Total Length of Stream (ft): 32641.90

Select Land Use Type

- (•) Cropland
- ( ) Hay/Pasture
- ( ) Low Density Urban
- ( ) High Density Urban

Left Bank (facing upstream)

Riparian Buffer (Grass and Forested)

Length of Stream with Buffer (ft): 1500

Average Buffer Width (ft): 15

Acres of Buffer: 0.52

Streambank Fencing

Length of Stream with Fencing (ft): 3600

Streambank Stabilization

Length of Stream Stabilized (ft):

Right Bank (facing upstream)

Riparian Buffer (Grass and Forested)

Length of Stream with Buffer (ft): 2100

Average Buffer Width (ft): 15

Acres of Buffer: 0.72

Streambank Fencing

Length of Stream with Fencing (ft): 4200

Streambank Stabilization

Length of Stream Stabilized (ft):

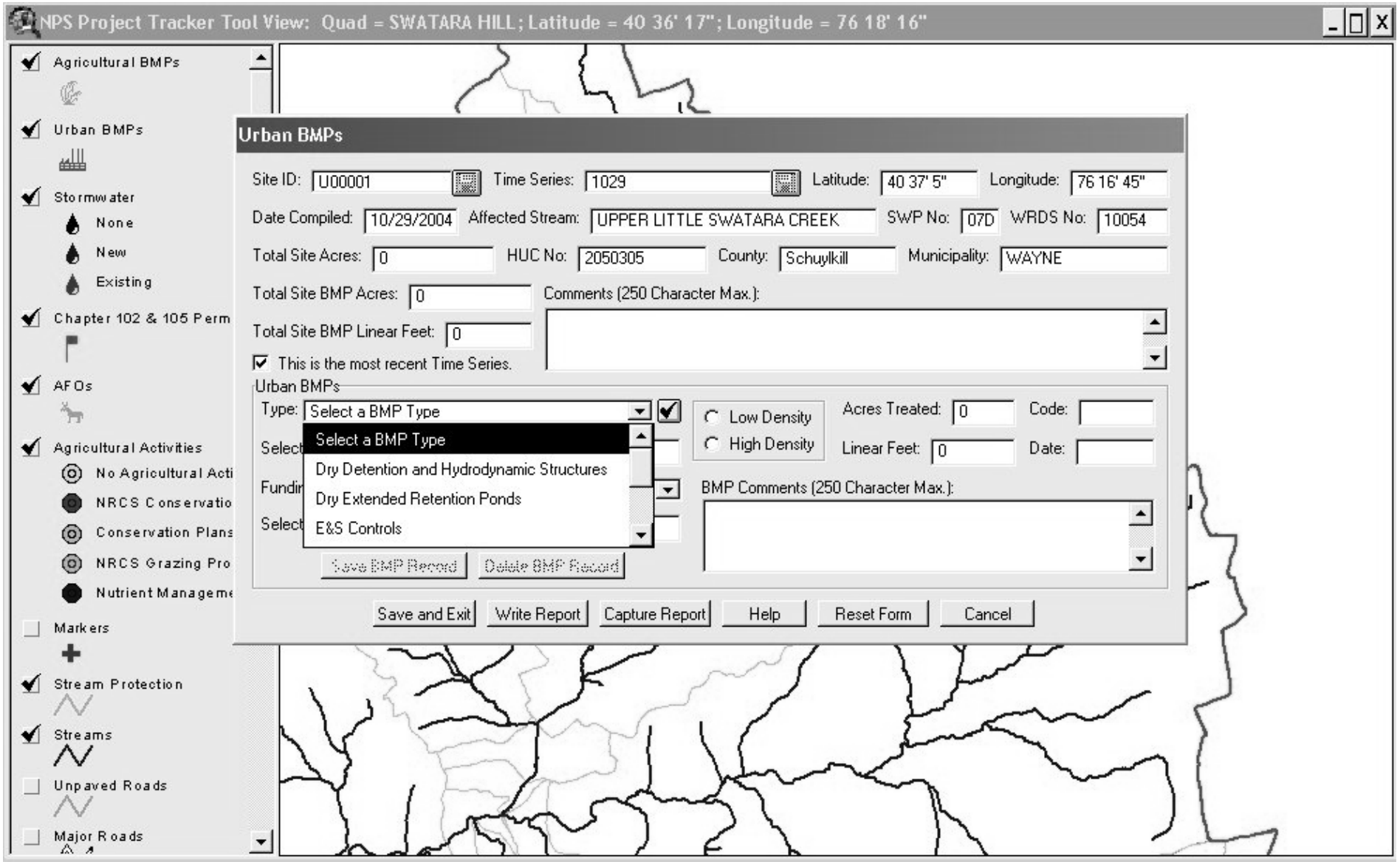
Comments (250 Character Max.):

Recently implemented activities

- [x] This is the most recent Time Series.

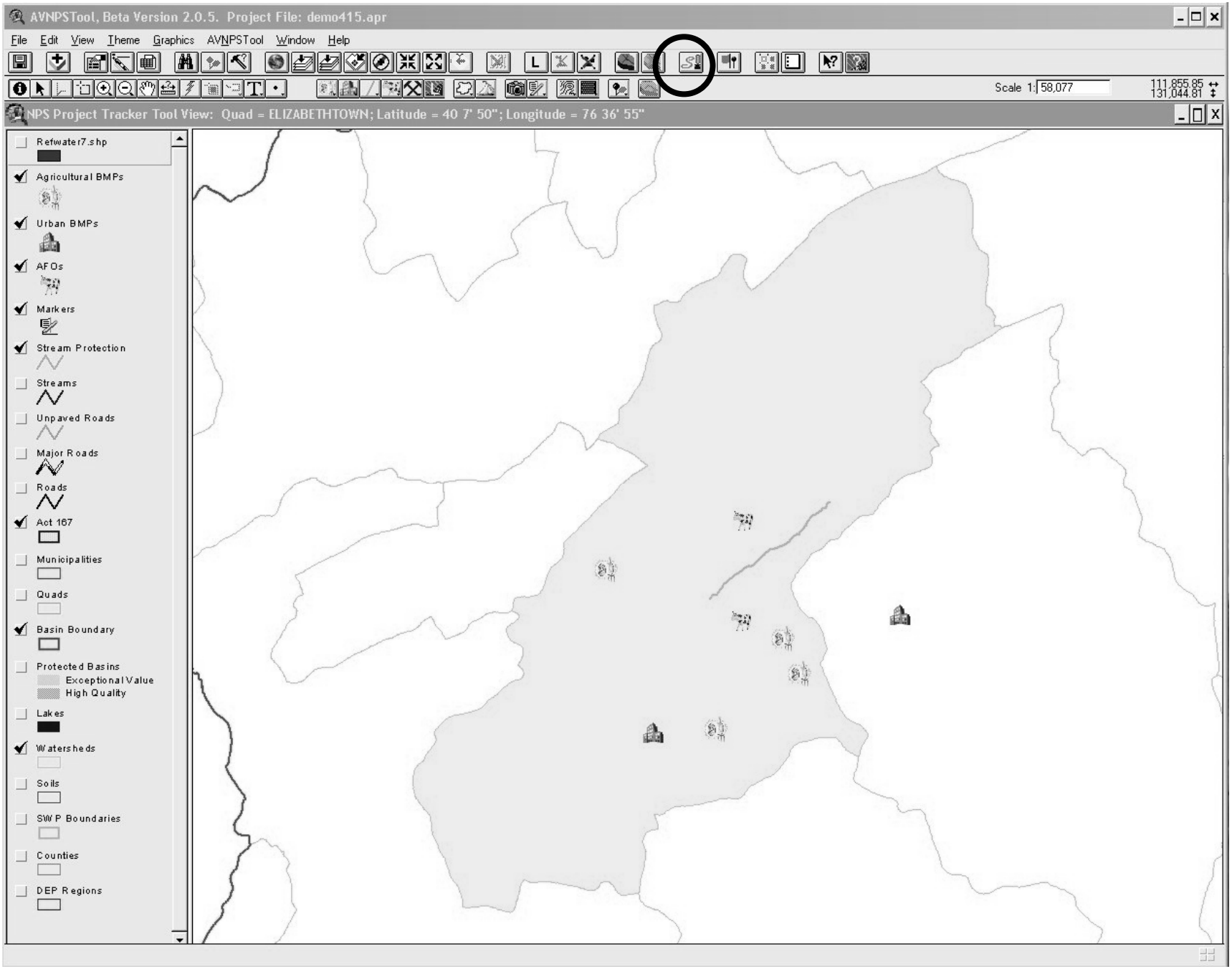
Help | Write Report | Capture Report

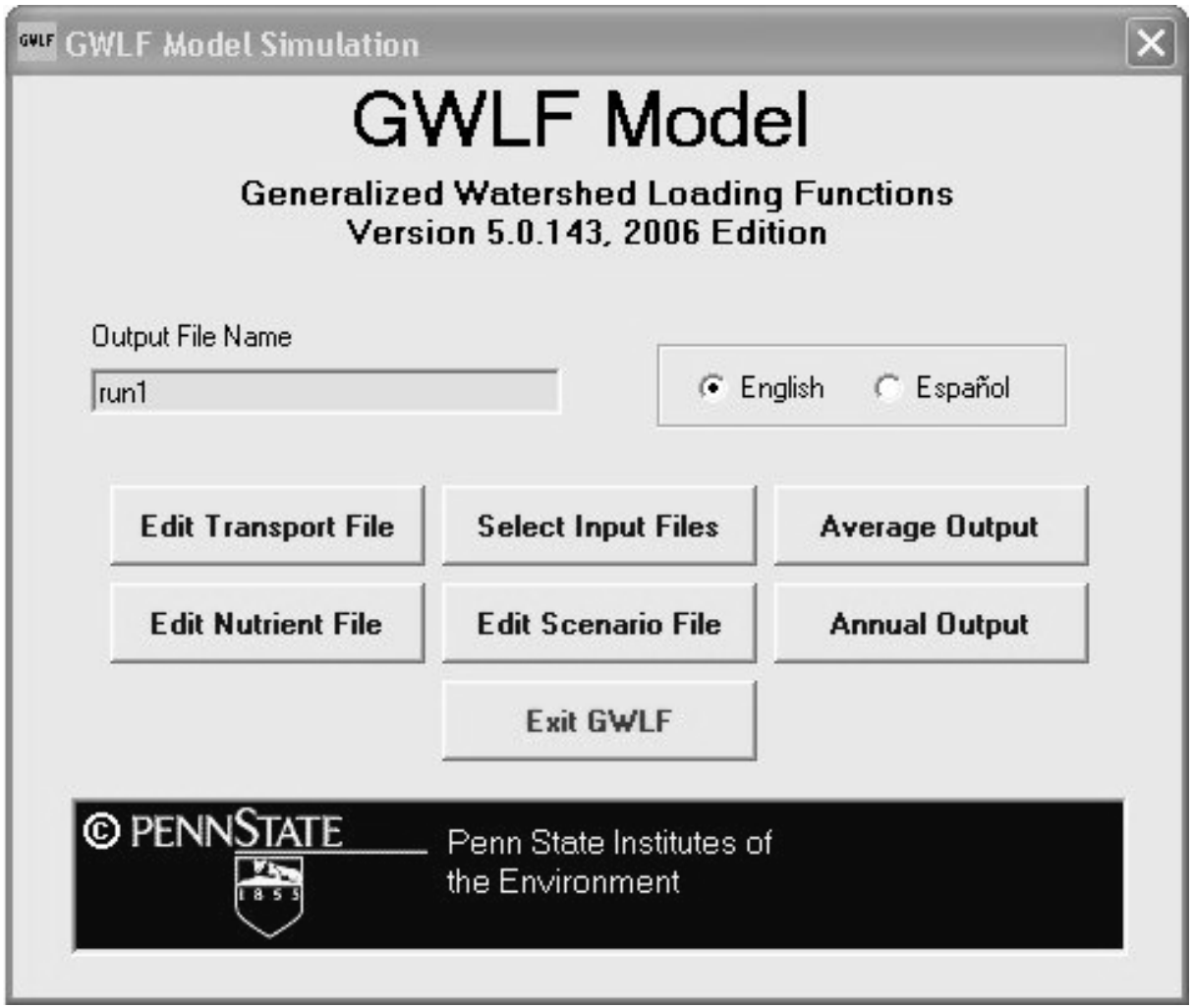
Save | Reset Form | Cancel

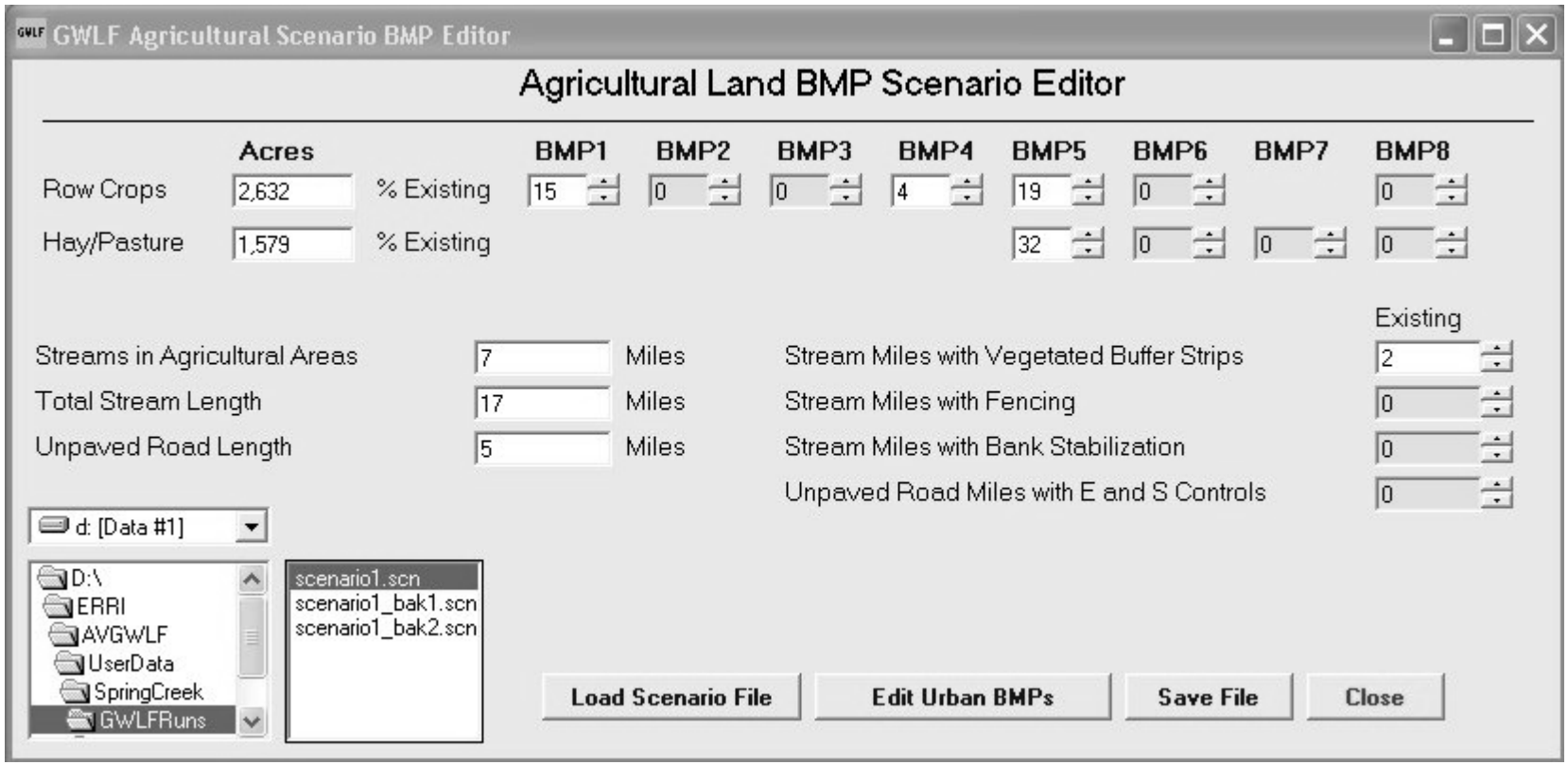

NPS Project Tracker Tool View: Quad = SWATARA HILL; Latitude = 40 36' 17"; Longitude = 76 18' 16"
Agricultural BMPs
Urban BMPs
Stormwater
None
New
Existing
Chapter 102 & 105 Perm
AFOs
Agricultural Activities
No Agricultural Acti
NRCS Conservatio
Conservation Plans
NRCS Grazing Pro
Nutrient Manageme
Markers
Stream Protection
Streams
Unpaved Roads
Major Roads
Urban BMPs
Site ID: U00001
Time Series: 1029
Latitude: 40 37' 5"
Longitude: 76 16' 45"
Date Compiled: 10/29/2004
Affected Stream: UPPER LITTLE SWATARA CREEK
SWP No: 07D
WRDS No: 10054
Total Site Acres: 0
HUC No: 2050305
County: Schuylkill
Municipality: WAYNE
Total Site BMP Acres: 0
Comments (250 Character Max.):
Total Site BMP Linear Feet: 0
This is the most recent Time Series.
Urban BMPs
Type: Select a BMP Type
Select a BMP Type
Dry Detention and Hydrodynamic Structures
Dry Extended Retention Ponds
E&S Controls
Low Density
High Density
Acres Treated: 0
Code:
Linear Feet: 0
Date:
BMP Comments (250 Character Max.):
Save BMP Record
Delete BMP Record
Save and Exit
Write Report
Capture Report
Help
Reset Form
Cancel

Linkage with AVGWLF and PRedICT

- *Pass data from AVNPSTool to AVGWLF watershed model for more accurate calculation of nutrient and sediment loads.*
- *Pass data to PRedICT for more accurate representation of BMPs and other in-place pollution mitigation activities.*


AVNPSTool, Beta Version 2.0.5. Project File: demo415.apr
File Edit View Theme Graphics AVNPSTool Window Help
Scale 1: 58,077
111,855.85
131,044.81
NPS Project Tracker Tool View: Quad = ELIZABETHTOWN; Latitude = 40 7' 50"; Longitude = 76 36' 55"
Refwater7.shp
Agricultural BMPs
Urban BMPs
AFOs
Markers
Stream Protection
Streams
Unpaved Roads
Major Roads
Roads
Act 167
Municipalities
Quads
Basin Boundary
Protected Basins
Exceptional Value
High Quality
Lakes
Watersheds
Soils
SWP Boundaries
Counties
DEP Regions

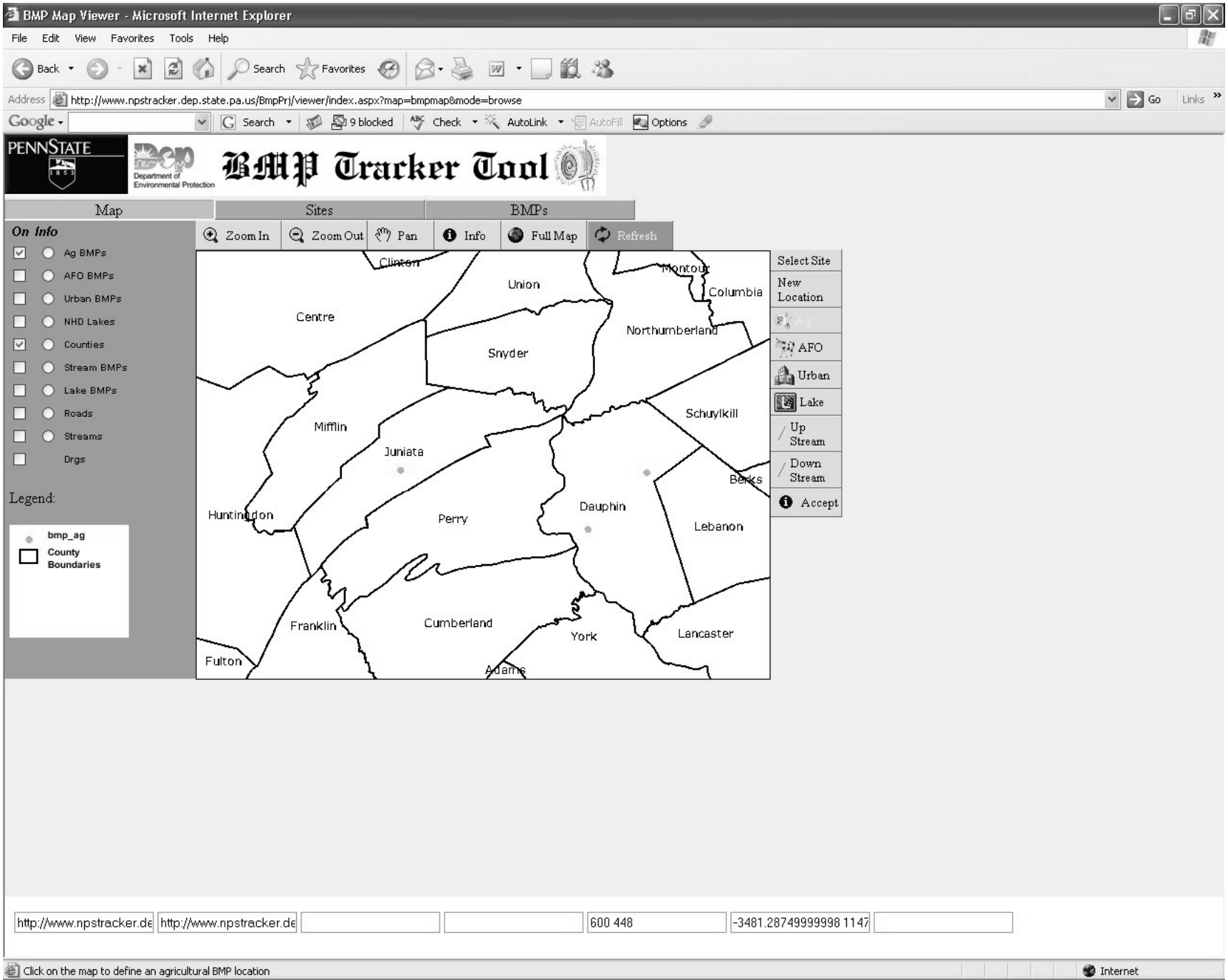

GWLF Model Simulation
GWLF Model
Generalized Watershed Loading Functions
Version 5.0.143, 2006 Edition
Output File Name
run1
English
Español
Edit Transport File
Select Input Files
Average Output
Edit Nutrient File
Edit Scenario File
Annual Output
Exit GWLF
© PENNSTATE
1855
Penn State Institutes of
the Environment


GWLF Agricultural Scenario BMP Editor
Agricultural Land BMP Scenario Editor
Acres
BMP1
BMP2
BMP3
BMP4
BMP5
BMP6
BMP7
BMP8
Row Crops
2,632
% Existing
15
0
0
4
19
0
0
Hay/Pasture
1,579
% Existing
32
0
0
0
Existing
Streams in Agricultural Areas
7
Miles
Stream Miles with Vegetated Buffer Strips
2
Total Stream Length
17
Miles
Stream Miles with Fencing
0
Unpaved Road Length
5
Miles
Stream Miles with Bank Stabilization
0
Unpaved Road Miles with E and S Controls
0
d: [Data #1]
D:\
ERRI
AVGWLF
UserData
SpringCreek
GWLFRuns
scenario1.scn
scenario1_bak1.scn
scenario1_bak2.scn
Load Scenario File
Edit Urban BMPs
Save File
Close

“Re-Tooling” of AVNPSTool

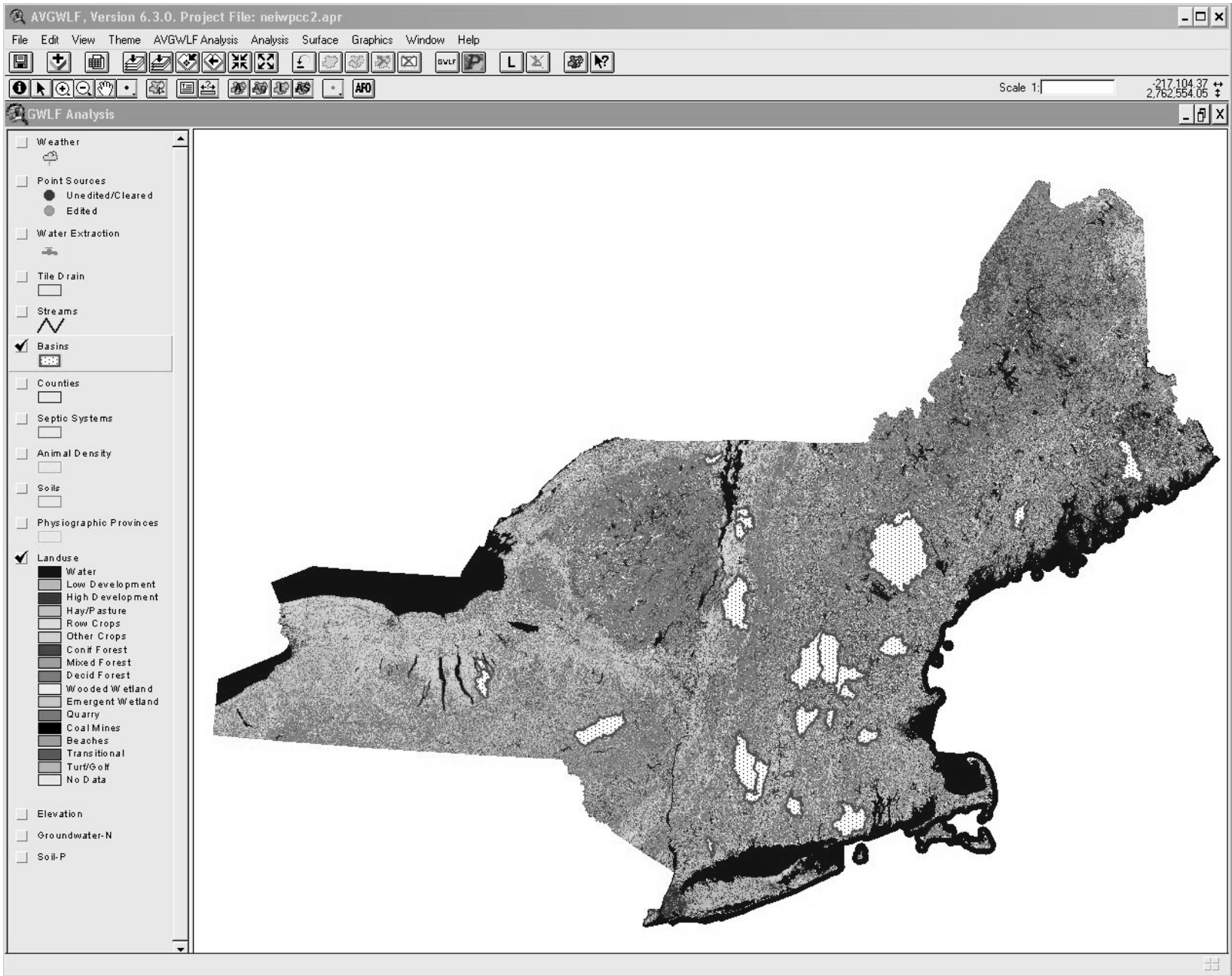
Objectives

- Create Web-enabled version of AVNPSTool to support development of statewide database on BMPs and other NPS pollution mitigation activities.
- Provide authorized users (e.g., state agency and conservation district personnel) ability to add to and edit database.
- Allow other users ability to summarize and extract information on a watershed basis.


BMP Map Viewer - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://www.npstracker.dep.state.pa.us/BmpPrj/viewer/index.aspx?map=bmpmap&mode=browse
Go Links
Google Search 9 blocked Check AutoLink AutoFill Options
PENNSTATE
Department of Environmental Protection
BMP Tracker Tool
Map
Sites
BMPs
On Info
Ag BMPs
AFO BMPs
Urban BMPs
NHD Lakes
Counties
Stream BMPs
Lake BMPs
Roads
Streams
Drgs
Legend:
bmp_ag
County Boundaries
Zoom In
Zoom Out
Pan
Info
Full Map
Refresh
Clinton
Union
Montour
Columbia
Centre
Northumberland
Snyder
Schuylkill
Mifflin
Juniata
Berks
Huntingdon
Perry
Dauphin
Lebanon
Franklin
Cumberland
York
Lancaster
Fulton
Adams
Select Site
New Location
AFO
Urban
Lake
Up Stream
Down Stream
Accept
http://www.npstracker.de
http://www.npstracker.de
600 448
-3481.28749999998 1147
Click on the map to define an agricultural BMP location
Internet

Locations Where AVGWLF Has Been Used or is Being Tested

- *Pennsylvania (entire state)*
- *Bulgaria (Yantra Basin)*
- *Mexico (several basins)*
- *North Carolina (Pasquotank River)*
- *Virginia (by VA Tech)*
- *Ontario (CANWET)*
- *Sweden (Ronne A basin)*
- *New England and New York*


AVGWLF, Version 6.3.0. Project File: neiwpcc2.apr
File Edit View Theme AVGWLF Analysis Analysis Surface Graphics Window Help
Scale 1:
-217,104.37
2,762,554.05
GWLF Analysis
Weather
Point Sources
Unedited/Cleared
Edited
Water Extraction
Tile Drain
Streams
Basins
Counties
Septic Systems
Animal Density
Soils
Physiographic Provinces
Landuse
Water
Low Development
High Development
Hay/Pasture
Row Crops
Other Crops
Conif Forest
Mixed Forest
Decid Forest
Wooded Wetland
Emergent Wetland
Quarry
Coal Mines
Beaches
Transitional
Turf/Golf
No Data
Elevation
Groundwater-N
Soil-P

Penn State GIS Support Group - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://www.orser.psu.edu/gissupport/ Go Links

PENNSTATE

Penn State GIS Support Center

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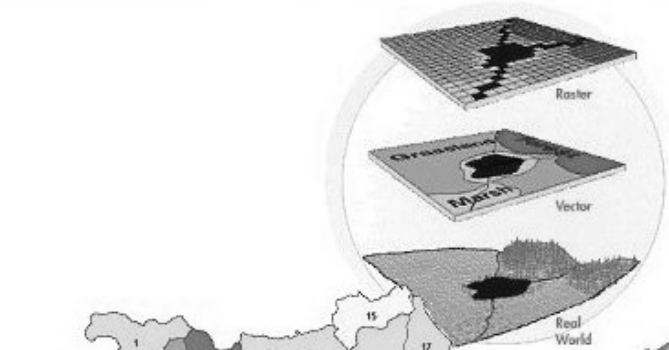

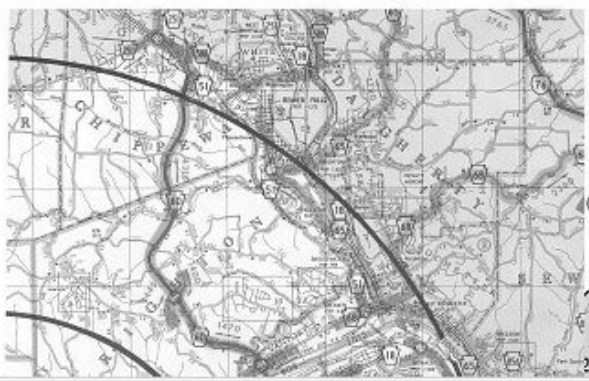

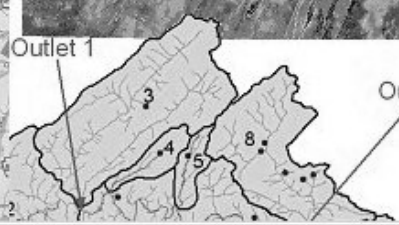

Internet